

MOTOR AGE

ELMORE WITH CLEAN SCORE MUNSEY WINNER



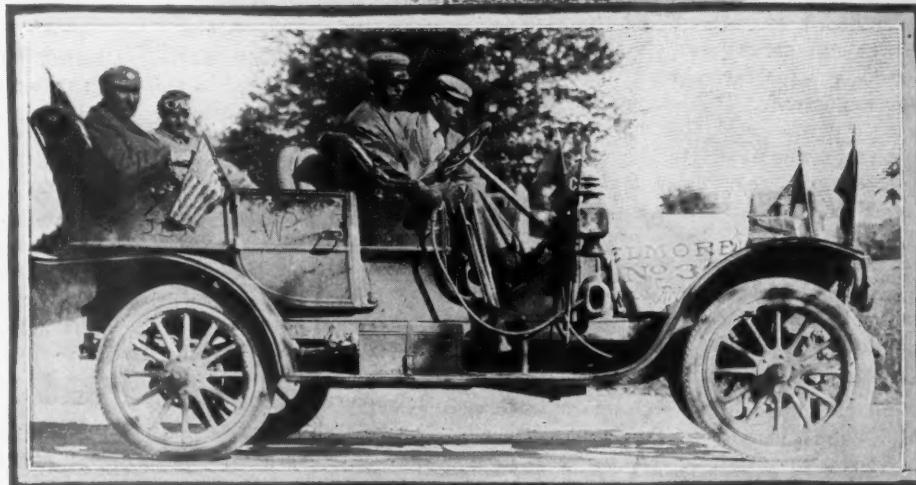
THE MUNSEY TOURISTS

MUNSEY TOUR WINNERS

Sweepstakes Prize—Won by Elmore with a perfect score.

Class 1—Ford	6 points
Class 2—No. 9 Maxwell.....	29 points
Class 3—No. 12 Pullman....	62.3 points
Class 4—Elmore	Perfect
Class 5—American Simplex....	.9 point
Class 6—Renault	4 point

WASHINGTON, D. C., Oct. 2—Premier honors in the Munsey reliability contest were carried off by the Elmore, entered by Frank Hardart, of Philadelphia, and driven by his son. According to the calculations of the technical committee this was the only car to survive the tour with a perfect score, winning the trophy in division 4, for cars costing \$2,001 to \$3,000. It also won the sweepstakes prize for the car making the best score in the tour. This award has been protested by Ray W. Harroun, driver of No. 30 Marmon, which was penalized .7 point. The grounds for the protest as set forth by Harroun are as follows:



PERFECT-SCORE ELMORE, WINNER OF FIRST PRIZE

"The penalizations against the Marmon, in my opinion, were on technicalities which should have been considered neg-

ligible, considering the amount of leeway given all contestants. The Elmore, in my opinion, finished the contest with defective

brakes, which was demonstrated by the fact that this car ran into the Marmon when approaching Washington. During the excitement of the moment the driver of the Elmore made the remark that he 'had no brakes' as his excuse for the incident. Furthermore, the Elmore had a very noticeable dish in the left front wheel, showing that the spindle was badly bent. During the latter part of the tour the Elmore had a bad knock under the bonnet, which was very noticeable when the car was standing still and the engine running.

"I claim that the penalization given me of .1 point on the road score for removing and replacing the filler cap of the radiator, while the car was in motion; .5 point for a very slight perceptible shake in the right front wheel bearing, and .1 point for what I consider an allowable play in one spring cleat, should not have been made against the Marmon."

Protest Not Allowed

Referee Trego, in passing on the Harroun protest, refused to sustain it, pointing out that the Elmore's brakes worked perfectly in the brake test. As for the penalization of the Marmon on the radiator incident to which objection was made, the observer's card stated that Harroun was plugging around the radiator cock to stop the water splashing out. Harroun signed the observer's card, which was taken as evidence that that was what he was doing when the penalty was inflicted.

The other five winners were No. 7 Ford in division 1 for cars costing \$850 and under, with 6 points penalty; No. 9 Maxwell in division 2 for cars costing \$851 to \$1,250, with 29 points; No. 12 Pullman in division 3 for cars costing \$1,251 to \$2,000, with 62.3 points; No. 21 American Simplex in division 5 for cars costing \$3,001 to \$4,000, with .9 point, and No. 28 Renault in division 6 for cars costing \$4,001 and over, with .4 point.

The trophy in division 3 originally was given to the Crawford, but the fact that a front wheel was replaced the first day, which did not appear on the observer's card, gave the car a greater penalty than first appeared. This made No. 12 Pullman the winner of this division, but the award of the trophy to this car has been protested by the Carter Motor Car Corporation, of Washington, entrant of No. 5 Washington. The basis of this protest is that the Pullman, which sustained a broken spring, could not replace it for \$2 as claimed. No. 5 Washington had 68 points against it.

Details of Penalizations

The Ford received a total penalization of 6 points, of which 1.4 points were sustained for carburetor trouble the first day and .3 point for stalling the motor that day. On the second day .2 penalty was again levied for stalling the motor twice and .1 point for adjusting the carburetor. In the technical examination the car lost .2 point for a loose right rear fender bolt



AMERICAN SIMPLEX, WINNER IN CLASS 5
MAXWELL, WHICH WAS DECLARED WINNER IN CLASS 2

and loose bolts on the right and left transmission arms; .5 point for a loose extension muffler pipe; .1 point for a loose nut on the driving shaft; .2 point because the muffler cut-out stuck open, and 3 points because the front wheels were loose.

Keeler Wants His Score

No. 29 Hupmobile, the other entrant in division 1, was listed as finishing as a non-contestant, but the driver objected to this procedure, stating he would prefer to have the car's score made up rather than have it placed in the non-contestant division. The Hupmobile sustained an accident coming out of the garage at Willimantic which made it late in reaching Washington. R. W. Keeler, the driver, drove the car from Willimantic to Washington without stop, finishing at 10:30 o'clock September 30. Referee Trego is now figuring out his score.

The model Q Maxwell, winner in division 2, received a total penalization of 29 points. This car had a perfect score for 4 days, when Lambert stalled the motor, receiving .1 point, while on the last day .2 point was received for a loose magneto wire. In the technical examination .5 point was assessed for a loose right front

wheel, .1 for a loose left front lamp bracket, 4 points for the coming off of a rear axle truss rod, and 6 points for work on same; .1 point for loose muffler extension, 12 points because the rear universal joint was badly worn, and 6 points for work on same.

The Reo in this division lost 94.3 points, of which 27 points were lost on the road and the remainder in the final examination. The latter penalties consisted of 20 points for play in the steering wheel, 34 points for a worn-out steering knuckle and 12 points for work on same; .2 point for lost radius rod bolt and .5 point for replacing same, .1 point for a loose right rear spring clip, and .5 point because the drive chain was too loose. The car was a 1908 model that had been driven 15,000 miles by its owner.

No. 12 Pullman, winner of division 3, lost 62.3 points; the Crawford 71.9 points, No. 5 Washington, 68 points, No. 31 Washington lost 438.7 points, divided as follows: .1 point for stalling motor the first day, .1 point for tightening pump the second day, .2 point for stalling the motor twice and 31 points for being late in the final control the third day; 358.1 points for work done and for being late the fourth



RENAULT AND FORD, WINNERS IN CLASSES 1 AND 6
PULLMAN, WHICH WAS DECLARED WINNER IN CLASS 3

day, .3 point for stalling motor three times and .1 point for work on rear mud guard the fifth day, .1 point for stalling

motor and .4 point for tightening front fender the last day. This car lost 48.3 points on the final examination for play

in the steering wheel, loose front and rear mud guards, broken rear axle truss, crushed muffler exhaust pipe, loose magneto ribs, play in the fan bearing, and a leaky water pipe joint. No. 32 Washington received 1,555.6 points, 1,451 of which were received the fourth day, when accidents to the car delayed its arrival in Boston many hours. The car lost 74.6 points on the final examination.

Chalmers-Detroit's Demerits

In division 4 the Chalmers-Detroit drew a total penalization of 51.2 points, of which 49.2 were the result of the technical examination, and 2 points for stalling the motor twice and work done on the road. The technical examination developed a penalty of 7 points for a broken right front mud guard brace, .2 point for loose spring cleats, .1 for loose right front fender, .5 point for play in the left front wheel, .1 point for loose fan bearing, .6 point for loose rear fenders, .2 point for lost nut off fan shaft pulley, 35 points for a badly broken subframe in the rear of the transmission, .1 point for loose right front engine arm bolts.

Six and three-tenths points was the score of the Spoerer. On the first day this car was penalized .3 point for oiling the clutch, while on the sixth day 3.2 points penalty was incurred, of which .8 was for removing wires from and adjusting the magneto, 1.6 for adjusting the timing rod and .2 for cleaning the carburetor. On the last day the motor was stalled twice, which added .2 point. In the technical examination the car lost .1 point for lost motion in the steering gear, .2 for loose front spring cleats, 2.1 for missing commutator and .2 for lost bolt off mud pan.

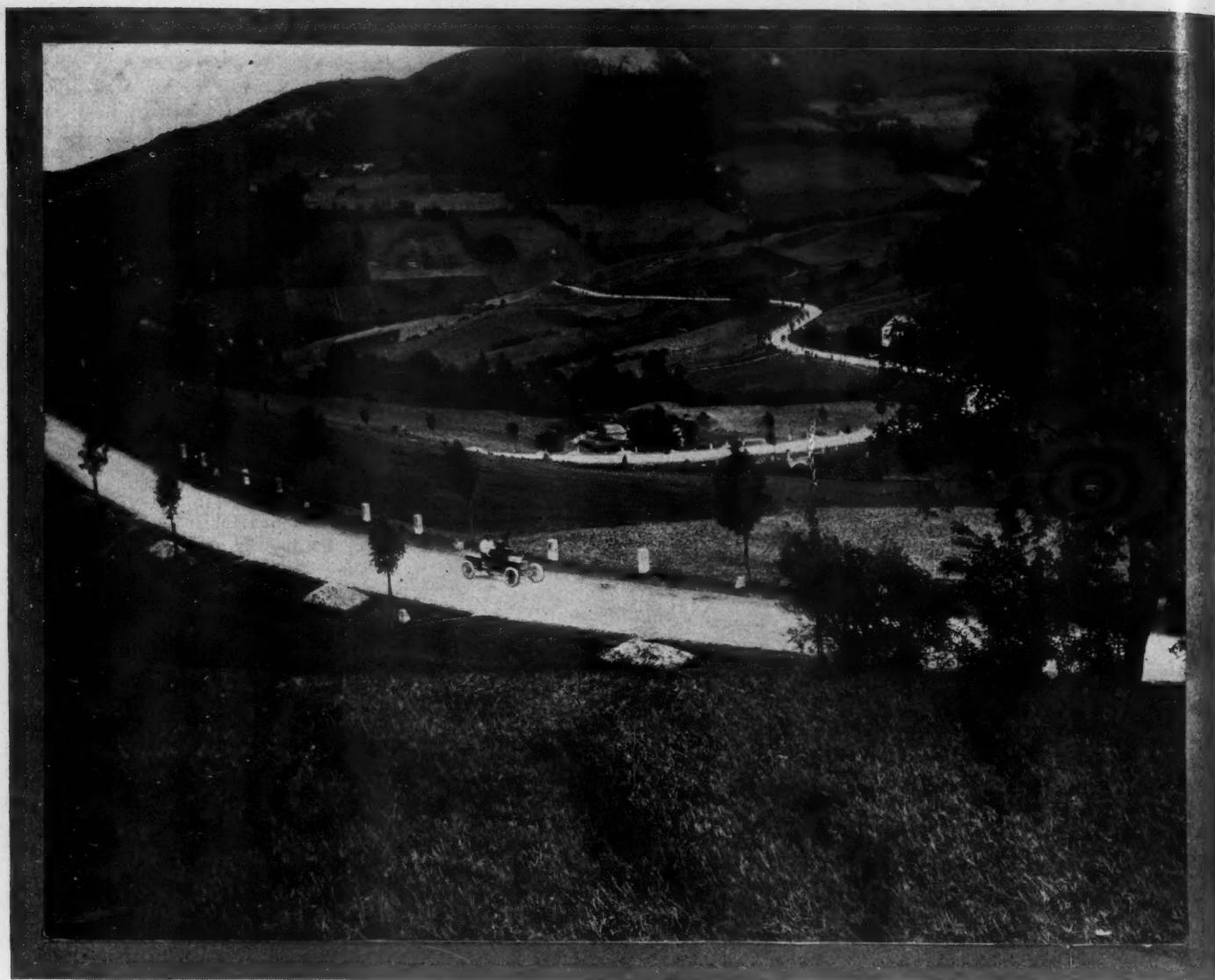
The Corbin finished with 662.1 points

(Continued on page 20.)

FINAL REPORT OF TECHNICAL COMMITTEE ON THE MUNSEY TOUR RESULTS

No.	Division	Car	First Day	Second Day	Third Day	Fourth Day	Fifth Day	Sixth Day	Seventh Day	Road Total	Final Examination				Grand Total
											Work Time	Estimated Time	Cost	Total	
7 29	1 1	Ford Hupmobile.....	1.7 .2	.3 0	0 .4	0 0	0 10.3	0	0 2.	4.	4.	6.	6.
9 26	2 2	Maxwell Reo.....	0 0	0 0	0 4.	0 0	.1 2.5	0 0	20.5 27.	.3	33.1	34.2	28.7 67.3	29. 94.3	
5 12 24 31 32 37	3 3 3 3 3 3	Washington Pullman Crawford Washington Washington Pullman .....	.2 0 21. .1 0 0	.1 0 0 .1 0 5.4	26.6 49.1 .4 31.2 2.2 1000	.6 0 0 358.1 .4 With drawn	0 .1 0 4.5 .5 With drawn	0 0 0 0 0 With drawn	.5 .7 0 0 0 With drawn	28. 49.9 21.4 486.4 1481. .....	..... 8.4 50.5 23.9 24.1 .....	..... 4. 50.5 24.4 50.5 .....	..... 12.4 50.5 48.3 74.6 1005.4	68. 62.3 71.0 438.7 1555.6
1 11 14 15 18 20 30 34 36 16	4 4 4 4 4 4 4 4 4 4	Chalmers-Detroit Maryland Spoerer Columbia Corbin Winton Marmon Selden Elmore Croxton-Keeton .....	.2......3 .1 0 1.1 0 .2 0 .5	1.5 0 With drawn 0 0 0 1000 0 4.3	0 0 0 0 0 0 0 0 0 1.1	0 3.2 0 10.4 0 0 0 0 0 With drawn	0 0 0 1 0 0 0 0 0 With drawn	0 0 0 .1 0 0 0 0 0 With drawn	1.7 2.2 1 0 1.1 0 0 0 With drawn	..... 3.7 35.2 616.9 1.1 0 0 With drawn	..... 2.6 1000.1 35.2 45.2 4.4 .6 1000.2 Perfect	..... 6.3 1000.1 1000 662.1 5.5 .7 1000 1009.5	50.9 6.3 1000.1 662.1 5.5 .7 1000 1009.5	
13 21 17	5 5 5	Pullman American Simplex Croxton-Keeton	0 0 0	0 .1 0	0 0 0	0 0 0	.2 0 1000	.6 0 With drawn	0 0 With drawn	..... ..... .....	5.6 .8	4.3 .8	9.9 .8 1000	10.7 .9 1000
27 28	6 6	Matheson Renault .....	.4 0	0 0	1.1 0	1.3 0	0 0	0 0	Disqualified 0	..... 0	..... 0	..... 0	..... 0	4. 4.

*Finished as non-contestant, but requests report on total penalization



WINDING ROAD USED BY AUSTRIANS FOR THE CLASSIC SEMMERING HILL-CLIMB, A DISTANCE OF 6.2 MILES, IN WHICH AN AVERAGE OF 52.2 MILES PER HOUR WAS MADE

VIENNA, Sept. 20—Old Father Time was shaken down pretty badly yesterday at the eleventh annual Semmering hill-climb. Otto Salzer, driving the 1908 grand prix Mercedes, climbed the 10-kilometer course up the historic mountain roads in 7 minutes 7 seconds, averaging 52.2 miles an hour and clipping 16½ seconds from his own record of 1908. To make it certain that the climb record would be in the Mercedes family for some time at least Willy Poegle, the popular German driver, also broke the former record in a huge Mercedes racer by going up the hill in 7 minutes 13½ seconds, or 6½ seconds slower than Salzer.

The victory of the Mercedes in this year's climb enabled Banker Dreher, who owns the car Salzer drove, to establish a record which probably is unique in the annals of motoring contests of all kinds. He now has to his credit five victories in as many years in an event which has been contested for eleven times. In two of the annual climbs in which he took first place he also secured second and only once since he had his cars starting did he fail to be the winner. That was in 1907, when he

Salzer in Big Mercedes Climbs

took second place to Poegle's first in one of the big Mercedes cars.

It will be noticed from the brief history given herewith that every year since the climb has been promoted the time record of the preceding year has been broken. While it took 22 minutes 1 second to cover the 6.2 miles in 1899 it took less than one-third this time this year, and while the average speed per hour was 16.8 in the first event it was 52.2 this year.

Third honor for fastest time went to the Benz grand prix car driven by Fritz Erle. He came within 5½ seconds of the former record. Joerns, in the 130-horsepower Opel, was fourth and would have been able to do better had he been more familiar with the course. He had driven over it but once before starting.

Thirty-four cars and eleven motor cycles started. Thirteen classes of cars and seven of motor cycles had been provided—altogether too many. No entries were received for four classes of cars. The one

with the largest number of starters was that for touring cars up to 16 horsepower and then came the one for cars of 28 to 35 horsepower, there being nine starters in the first-named class and five in the second.

Of the many hill-climbing contests which have been and still are on the calendar of annual events in Europe there are three which stand out above all the others. These are the Mount Ventoux, Gaillon and Semmering. It was in 1899 that the first Semmering hill-climbing meeting was held, the distance chosen being 10 kilometers—6.2 miles—on a road with many turns, some very abrupt, and with but few stretches permitting the driver to go at full speed, the gradient varying from 5 to 10 per cent. The best time was made by A. Spitz, who covered the 6.2 miles in 22 minutes 1 second in his 2½-horsepower de Dion-Bouton tricar. Spitz averaged 16.8 miles an hour. In 1900 the winner was J. Dietrich, in a 3½-horsepower de Dion-Bouton tricar, his time being 14:38½. Mercedes cars start-



1—BANKER DREYER, OWNER OF WINNING CAR; DENOTED BY STAR 2—SALZER, DRIVER OF MERCEDES 3.—ROPE FENCE KEEPS THE CROWD BACK
4—GROUP OF OFFICIALS AT FINISH

Semmering Hill at a Record Pace

ed early to get their name on the winner's page. In 1901 a 35-horsepower Mercedes driven by R. von Stern was the winner in 12:30% and a 14-horsepower Lohner-Porsche electromobile, driven by Paulal, was second in 14:29.

In 1902 Werner, now driver for Emperor William, won the climb in a 60-horsepower Mercedes belonging to the late Gray Dinsmore, the American sportsman. The time was 10:37½. Duray, the French driver, was second, making the climb in 14:24% on a motor cycle. Dinsmore again had the honor of winning the trophy in 1903, when Braun drove his 60-horsepower Mercedes to victory in 8:47%, a record which at that time was heralded all over the continent as marvelous.

It was in 1904 that Theodor Dreher made up his mind that he wanted to win the trophy and for that purpose he purchased what he thought to be at the time the fastest racing car built, an 80-horsepower Austrian Mercedes. He engaged the ser-

vices of Braun and the latter won in 8:11%. Hieronymus, in a 30-horsepower Spitz voiturette, was a good second in 8:52%. In 1905 Dreher had two monster racers in the contest. They took first and second prize, Braun driving the winning 100-horsepower Mercedes, breaking the record by bringing the time down to 7:50%.

By winning the event for the third consecutive time with a car of similar construction and having the same driver as in the two previous races Dreher won the original Semmering trophy in 1906 when Braun drove his 120-horsepower Mercedes up the hill in 7:47. Dreher's 90-horsepower Mercedes was second in 8:44% and a 24-horsepower Opel with Joerns at the wheel was third in 8:46. In 1907 Banker Dreher offered a new trophy. The event was won by Willy Poewe in a Mercedes, 5.9 by 6.9, in 7:29%. Salzer in a Mercedes was second in 7:45% and Gabriel in a Lorraine-Dietrich third in 8:03. Last year

Salzer in Dreher's Mercedes, 5.9 by 6.9, was the winner in 7:23%. Poewe, also in a Mercedes, was second in 7:29% and Henriet in a Benz was third in 7:42. Summaries:

CARS UP TO 16 HORSEPOWER		
Car and H. P.	Driver	Time
Laurin-Klement, 16,	Hieronymus	9:03
Laurin-Klement, 16,	Kolowrat	9:14
Mercedes, 16,	Salzer	9:20
CARS 16 TO 22 HORSEPOWER		
Adler, 22,	Wilhelm	9:03
Puch, 22,	Slevogt	9:46 3-5
Vauxhall, 18,	Selz	10:49 3-5
CARS 22 TO 28 HORSEPOWER		
Benz, 28,	Wilhelm	8:21 3-5
Benz, 28,	Ludwig	8:27
Opel, 27,	Mousen	9:48
CARS 28 TO 35 HORSEPOWER		
Opel, 30.5,	Michel	8:19
Aus. Daimler, 32.5,	Hemetsberger	8:51 4-5
Opel, 32,	Lindpaltner	9:57 3-5
CARS 35 TO 46 HORSEPOWER		
Opel, Joerns	.	7:54 3-5
Benz, 46,	Erle	7:58 2-5
Aus. Daimler, 43,	Peter	9:20
1908 GRAND PRIX VOITURETTES		
Puch, Medinger	.	10:09
Szaire-Naudin,	Obruba	11:05
Puch, Lhuillier	.	11:23 1-5
CARS MAXIMUM BORE 2.95 INCHES		
Puch, Wolf	.	9:48 1-5
Puch, Puch	.	14:25
CARS 2.95-3.3 BORE		
Laurin-Klement,	Hieronymus	8:19 2-5
Laurin-Klement,	Wetzka	9:00
RACING CARS, UNLIMITED		
Mercedes,	Salzer	7:07
Mercedes,	Poewe	7:13 2-5
Benz,	Erle	7:29 4-5
Opel,	Joerns	7:36 3-5



Delayed Motor Car Deliveries

MOTOR AGE is frequently in receipt of inquiries from buyers of cars as to what recourse they can have against manufacturers or dealers who take deposits on cars and promise deliveries for a certain date and when delivery time comes begin postponing from week to week, until finally the delivery is a month or more late. Cases are on record at the present time where deposits have been made, conditional upon a future delivery, which delivery was 3 months late, but which manufacturers refused to surrender the deposit. One or two other common cases, and these have occurred with reputable car builders, are that when delivery time comes the agent has not on hand cars with the proper painting or equipment specifications and the buyer who has arranged his plans for a certain delivery is compelled to take a color scheme for which he did not contract for rather than have his business plans upset because of not receiving the car. Such occurrences as these are common in large cities, and in every case the buyer has no recourse, and has had to gradually let his angry feelings subside and learn to admire a color scheme which he did not bargain for. When a buyer contracts for a car, if there is any doubt as to delivery, he should be protected by a contract which, if delivery was not made in a reasonable time, he would have some recourse against the seller. At times it is impossible to make delivery, but the seller knows this when he makes the sale, which is the time he should take this matter up and should not make promises of such deliveries unless more certain he will be able to do so than he is in a great many cases where promises have been made. The seller will undoubtedly unload the burden on the factory, and the factory on the accessory, or material house, but it matters little where the responsibility rests; if the seller has made definite promises he should stand by them, and he should not make promises of deliveries without a good degree of certainty that he can deliver on time. The buyer has no right to suffer for delayed deliveries and much less for other unfilled features of his contract. Many a dealer has made a sale on a promised delivery when he knew at the time he could not make deliveries, but was aware if he had said such the sale would go to a rival dealer, who could make delivery. This is an abuse that should be corrected. It is working an injury to the industry in that it is establishing in the minds of many a feeling of uncertainty and lack of confidence in some of the departments of the industry.

Amateur Sociability Runs

A COMMENDABLE type of reliability run is the sociability contest that has attained considerable proportions during the present season. These runs are the elements of simplicity in that there is but one feature in connection with them, namely, the cars go from one point to another in their attempt to get closest to an unknown speed schedule which has been selected by an official and which schedule is not known to any of the contestants. As far as testing of cars is concerned these runs do not prove anything, but they are big factors in working up amateur interests in motor sports. The amateur element is a strong one and one to be developed. In England amateur contests are held by every motor club and these are productive of more satisfaction than many of the professional contests. Prospective car buyers are very desirous of seeing what their fellow-citizens can do with their cars and this is a potent buying factor with many. The sociability test brings this out excellently.

Fixed-Penalty Schedules

THE Munsey tour which has just ended is one more example of the troubles that may arise in contests where a final examination is made and the penalty for damaged parts is based on the price of the part and the length of time required to put it "in safe and satisfactory running condition." It is impossible in a day or 2 days, after a contest of this nature, to put some defects in "safe and satisfactory running condition." An example of this is a broken side member of the frame which means a complete dismounting of the motor, transmission and car parts, as well as the expenditure of a day or 2. If, at the end of each contest, a lot of repairing of this nature had to be done it would be necessary to have a portable high-class repair shop where difficult tasks could be done. With simple repairs the matter is different, and it is possible in a short time to make alterations or improvements, and penalize for the length of time. It is even questionable if this is well because at the end of a run a broken part in one car should not be penalized more than the same broken part in another car. The fixed penalty scale which has been used for a couple of years entirely obviates this work-shop scene at the end of each reliability run. In this fixed penalty schedule, penalties have not been arbitrarily selected, but are the outcome of a vast amount of work, in which the value of many parts is taken into consideration; in which the safety factor in conjunction with different parts is weighed; and in which the time element has been considered. With a fixed penalty a manufacturer understands before entering a contest what his penalties will be for broken and deranged parts at the end, which we believe is correct, in that no manufacturer should enter a contest without definitely knowing the exact nature of such an important part of it, as is the penalizing for technical defects at the end of a run.

Winter Car Comforts

WITH the approach of cold autumn weather the improvised winter car makes its appearance. When motor cars were first marketed, they were deemed impossible for winter use. As seasons passed both manufacturers and owners realized that winter bodies could be added in place of the open summer types. Owners, also, realized that it is possible to almost convert an open car with top into a closed car by means of storm curtains and side aprons. It is possible to do so, but the results obtained are not the most fascinating. The sight of faded, bulged-out side curtains on a cold winter day, with flapping straps, etc., does not impress upon the observer the thought of a comfortable winter ride. On the other hand, the inclosed coupe, or limousine type, with their good window space and cozy-looking interiors, do much to impress observers with the possible comforts of winter use of the motor car. The closed body is a strong argument every day to convince non-users of the feasibility of the motor car for all-the-year-around use, and as such is a factor that should not be neglected by manufacturers and dealers. The number of closed bodies is going to be greater this year than last, and the policy of owners storing the open body and fitting a closed winter type will increase. Hand-in-hand with the closed type should come some method of heating from the exhaust. The motor car has a heat power plant, and it is peculiar that the abundance of heat from the exhaust has not been utilized to a greater extent for the comforts of the passengers. This is particularly true in the case of open cars and is deserving of immediate attention.

SELDEN DECISION PRODUCES QUICK RESULTS

NEW YORK, Oct. 6—Special telegram—Developments of the past few days, and attendant possibilities of the near future indicate that the recent Selden patent decision will bring about startling changes in the motor car industry. Following the decision of Judge Hough came the information that the Association of Licensed Automobile Manufacturers undoubtedly would take a broad view of the situation, and not attempt anything which might prove detrimental to the industry as a whole. There has seemed to be a realization on both sides of the patent litigation at the present extraordinary demand for motor cars is inducing manufacturing preparations of such proportions as to arouse fears of a dreaded over-production and more or less disaster to all concerned, including those firms which bore the brunt of experimental expenses in the early days when the marketing of motor-driven vehicles proved somewhat unprofitable.

Conference Held in Buffalo

A conference of great importance, the first of the moves in a new alignment of concerns, was held in Buffalo Wednesday of last week, at which were present H. O. Smith, of the Premier Motor Mfg. Co. and chairman of the A. M. C. M. A. committee of management; Benjamin Briscoe, of the Maxwell-Briscoe Motor Co. and ex-chairman of the A. M. C. M. committee of management; C. G. Stoddard, of the Dayton Motor Car Co. and vice-chairman of the same committee; R. E. Olds, of the Reo Motor Car Co.; Charles Lewis, of the Jackson Automobile Co., and another member of the committee; William Mitchell Lewis of the Mitchell Motor Car Co., besides Mr. Mathews of the Jackson company, and Mr. Bate of the Mitchell company.

It was a natural sequence that a representative of the A. L. A. M. should be more or less prominent during the somewhat prolonged session. One question propounded to him was whether the A. L. A. M. would take in the A. M. C. M. A. as a whole, and the reply was that each company would have to make application and fulfill the conditions imposed, which are as follows: New members will be asked to pay 8-10th of 1 per cent, covering all cars delivered and sold since 1903, same being based upon the list prices of cars at the time of sale. It is understood that the licensed representative had power to offer special conditions, but no authority whatever to change them in any particular.

These concerns are understood to have decided at the Buffalo meeting to qualify for A. L. A. M. membership: Maxwell-Briscoe Motor Co., Reo Motor Car Co., Premier Motor Mfg. Co., Mitchell Motor Car Co., Dayton Motor Car Co., Regal Motor Car Co., Jackson Automobile Co.

It was only a couple of weeks ago that the Willys Overland Automobile Co.

Meeting of Independents Held in Buffalo Followed by Report that Seven A. M. C. M. A. Makers Will Join A. L. A. M.

* * *

Maxwell, Reo, Premier, Mitchell, Stoddard - Dayton, Regal and Jackson Said to be Ready to Apply For Membership

* * *

Manufacturers Fear Over-Production and Will Get Together to Prevent Market Being Gutted by Newcomers

vaulted the fence into the licensed field by absorbing the Toledo Motor Co., which held a Selden license. This will give a total of eight A. M. C. M. A. concerns on the licensed roll call.

Respecting future applications from the A. M. C. M. A. only such companies as may be recommended by the above concerns, and only those which have built cars on a considerable scale, will be considered by the A. L. A. M.

Once the A. L. A. M., after a reasonable length of time, concludes its consideration of new members, the indications are that it will proceed against all the remaining concerns and insofar as it is possible so to do, will prevent the many newcomers from an over-production which would flood the market to a disastrous degree.

In a letter sent out by the chairman of the A. M. C. M. A. executive committee following the meeting at Buffalo, the concluding paragraph read as follows:

"It seems to be the general opinion of those present—referring to the Buffalo meeting—who had conferred with their patent counsel that the hearing on appeal—referring to the Selden case—would probably occur at a comparatively early date, and if confirmed the position of the licensed association would be such that it would control the situation."

If this statement reports the general view of the unlicensed makers in the face of all the legal talent that has been employed in the Selden case it is not difficult to understand why eight important makers have decided to enter the licensed fold.

Ford's Attitude Unknown

Up to today the only news available from the Henry Ford camp was to the effect that his company would continue its independent course, although both the head of the concern and vice-president, James Couzens, have had various conferences in New York city, where all the leaders of the industry are now gathered.

An impression prevails that Mr. Ford will hold out rather than pay at this time the large sum which would be required for

royalties. If Ford appeals, it is contended by some, the measure of damages cannot be more than the 8-10th of 1 per cent, which is the basis of agreement between the licensed association and the companies already as good as taken in. Others say that the measure of damages will be more because the royalty has been all the way from 5 per cent down, it being reduced from time to time. But it is pointed out that there were but few Ford cars built during the time when the higher royalty was in vogue and if Ford puts up a fight all he has to risk is the cost of the appeal and defending the suit for damages which must be brought before the licensed association can spend any of Ford's money. This will be true if it is a fact that the measure of damages is now fixed by the agreements made with the companies that have accepted the Hough decision as final.

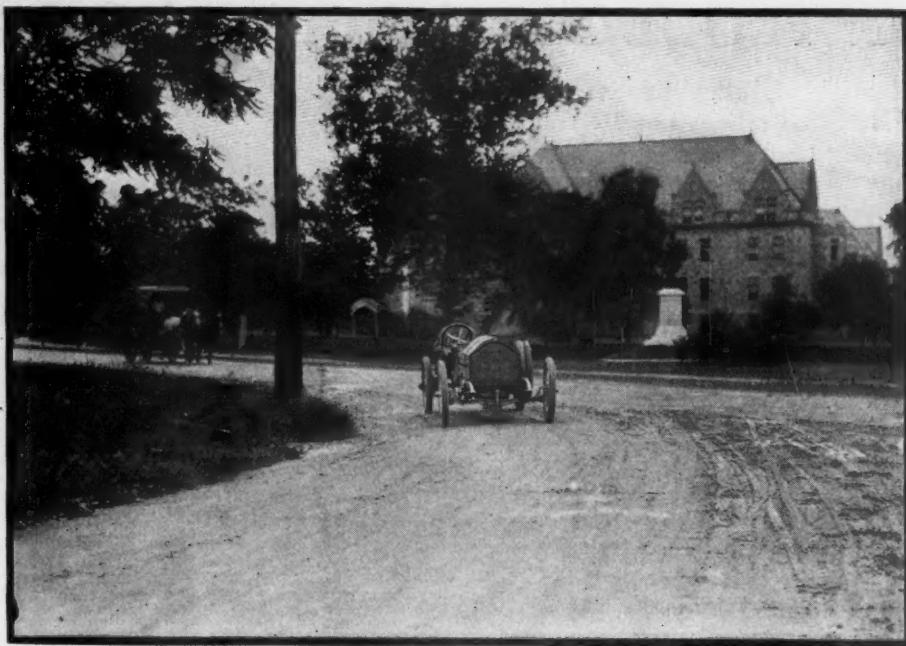
A decidedly interesting phase of the present situation relates to the General Motors Co., now comprising Buick, Oldsmobile, Welch, Rainier, Oakland, and Rapid, with W. C. Durant as the man in the saddle. It will be remembered that last winter, when the combine of which he is the head only included Oldsmobile and Buick, it refused to continue paying royalties, since which time a suit has been pending in the courts. Mr. Durant is on the ground, but whether he wants to renew his licensed affiliations, or whether he will be permitted to do so even if he is willing, are questions yet to be arranged.

Monthly Meeting Important

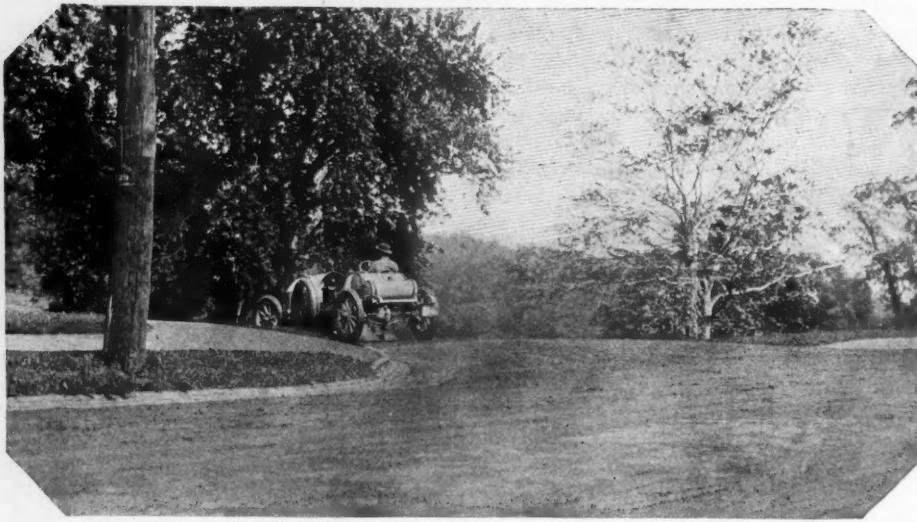
The A. L. A. M. has its regular monthly meeting today and all these matters of great moment will come before the association. None of the officers of the licensed body cared to be quoted in advance as to the probabilities, contenting themselves with the expression of an opinion that a broad view was being taken of the entire situation and that the general good of the industry was to be considered. This was the open expression of Colonel Charles Clifton, president of the licensed body for some time past, though he encountered some difficulty in convincing others of the wisdom of his course. His advice is likely to be quite potential at the present moment.

Believing that two shows are a necessity in New York city, it is probable no matter what the outcome will be in clarifying the situation that there will be no interference with the announced plans for the holding of the shows in Madison Square garden and Grand Central palace, the latter under the auspices of the A. M. C. M. A. One building could not possibly house all the exhibitors.

The National Association of Automobile Manufacturers yesterday held a meeting for the purpose of allotting space for the Chicago show and tomorrow the A. M. C. M. A. will have its drawing.



SECOND TURN ON BELMONT AVENUE, AN EASY SWEEP



LEFT-HAND TURN JUST BEYOND THE BRIDGE



TWO DANGEROUS TURNS AT THE RAILROAD BRIDGE

Field Completed for

PHILADELPHIA, Pa., Oct. 4—The first gun of the coming contest for the honors in the Fairmount park 200-mile stock chassis race, next Saturday, was fired this morning when the 7.8-miles course was opened at daylight to a dozen or more anxious entrants who were on the ground to try out their cars. There are twenty-one entries in hand, with one, and possibly two, additional starters, which will be announced later. At a meeting of the contest committee of the Quaker City Motor Club, last Tuesday evening, the entries of Bergdoll's 120-horsepower Benz and Barney Oldfield's car of the same make, which he entered as of 59.6 horsepower, were rejected, it being the opinion of the majority that the cars did not meet the official specifications of a stock machine.

The line-up will include some of the most famous track and road drivers, including Robertson, with a Simplex; Dingley and Lorimer, Chalmers-Detroit; Grant, Aleo; Haupt, Thomas; Zengle and Parkin, Chadwick; Wallace, Palmer & Singer; Chevrolet and Burman, Buick; and Seymour in a Lozier.

An examination of the course Saturday showed that it is in 50 per cent better condition than last year, when not a little new road had to be hastily constructed to round out the circuit. The stretch along the south concourse is absolutely flawless, as is the combination hairpin-S turn on Sweet Brier hill. Almost the entire stretch of 3 miles of the river road along the Schuylkill, which was the worst portion of the course last year, has been worked on until it is in nearly as good condition as the concourse. The bad turn under the Chamounix bridge has been improved, too, but it is still somewhat lumpy for fast work. After practice hours a gang of men will be kept at work at this point all this week. City Line avenue, as usual, is in the best of condition, and Belmont avenue is being worked upon to get it into mile-a-minute shape.

At a previous inspection of the course the committee induced the park commission to remove several telephone poles and fire-plugs located at turns, and which in the event of a bad skid might cause trouble. All in all, the course will be as safe as human ingenuity and hard work can make it. The main feature of the course which makes for safety is the boulevard

COMPLETE LIST OF ENTRANTS

Car.	Bore & Cyl.	Stroke.	Driver
1—Acme	6	5 x 5	Leinau
2—P. & S.....	6	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	Wallace
3—Simplex	4	6 1/10 x 5 3/4	Betz
		Not over	
4—Apperson	4	600 cu. in. *	
5—Lozler	6	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	Seymour
6—Benz	4	5 $\frac{3}{4}$ x 5	Howard
7—Welch	6	4 $\frac{1}{2}$ x 5	Hall
8—Thomas	6	5 $\frac{1}{2}$ x 5 $\frac{1}{2}$	Haupt
9—Thomas	6	5 $\frac{1}{2}$ x 5 $\frac{1}{2}$	Bergdoll
10—Chadwick..	6	5 x 6	Parkin
11—Chadwick..	6	5 x 6	Zengle

Fairmount Park Race

width of the roads throughout almost the entire circuit. Fast cars cannot be held up by slow ones, and in this respect alone a number of crack drivers have stated that the course is the fairest for all concerned in the country.

That a large crowd will be on hand next Saturday afternoon is positive. The homes of a million and a half of people are within a 5-cent carfare's ride of the course, and the half-holiday will bring out every man, woman and child who can get on a trolley car. The police arrangements, as personally looked after by the mayor and Superintendent of Police Taylor, are perfect. Fifteen hundred policemen, reinforced by miles of rope and wire fence, will keep the course clear, and additional guards and flagmen will be furnished by the Quaker City Motor Club. At dangerous turns, such as at Sweet Brier hill and at Chalmounix railway bridge, special care will be taken to protect the public.

Many parking spaces and grandstand boxes were disposed of at public auction last week, not a few of the former bringing 200 per cent more than the regular price. Many of the boxes also brought good figures, and the expectation of the promoters that at least \$20,000 will be turned over to the four charitable institutions which have been named as beneficiaries seems in a fair way of being realized.

The main stand is ready for its decorations and a large gang of carpenters is at work on the official and press stands and repair pits. The latter will be located above and below the tape directly in front of the big grandstand, thus affording the spectators a fine view of the exciting features attendant upon quick tire changes, taking on of supplies, etc.

Phone stations will be established at various points around the course, and the scoring arrangements have been under rehearsal for the past fortnight to insure the prompt and correct recording of the work of the various contestants. The score-board itself will be a vast improvement over last year's crude affair, which came in for no little-deserved criticism. A specially drilled corps of men will have charge of the board, while the Warner Instrument Co. will supplement the work of the scorers with its patent recording device, which shows the relative positions of the three leading cars.

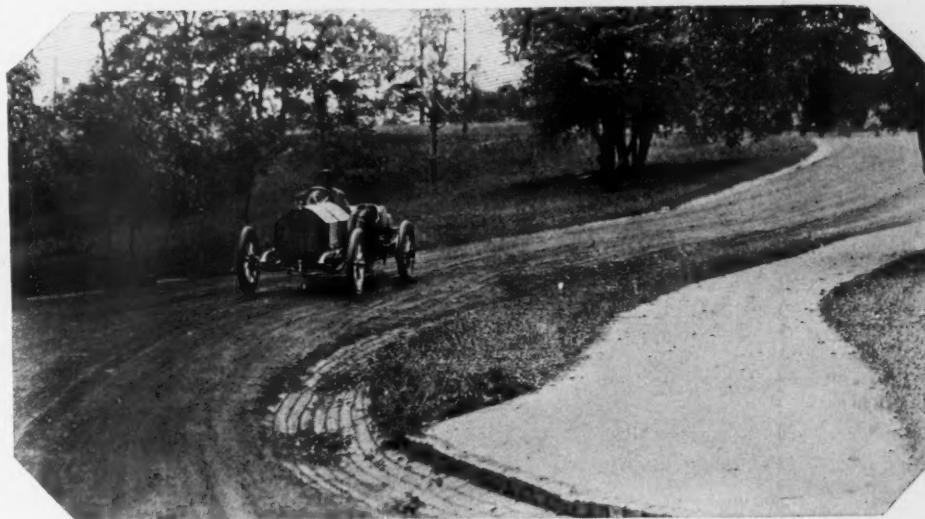
FAIRMOUNT PARK ROAD RACE

12—Alco	6	$4\frac{3}{4} \times 5\frac{1}{2}$	Grant
13—Columbia....	4	4.5×4.7	Coffey
14—Welch	6	$4\frac{1}{2} \times 5$	Bergdolt
15—Chalmers....	4	$5 \times 4\frac{3}{4}$	Dingley
16—Chalmers....	4	$5 \times 4\frac{3}{4}$	Lorimer
17—American ..	4	$5\frac{1}{2} \times 5\frac{1}{2}$	Drach
18—American ..	4	$5\frac{1}{2} \times 5\frac{1}{2}$	Hayes
19—Simplex	4	$6\frac{1}{2} \times 10 \times 5\frac{3}{4}$	Robertson
20—Buick	4	$4\frac{1}{2} \times 5$	Chevrolet
21—Buick	4	$4\frac{1}{2} \times 5$	Burman

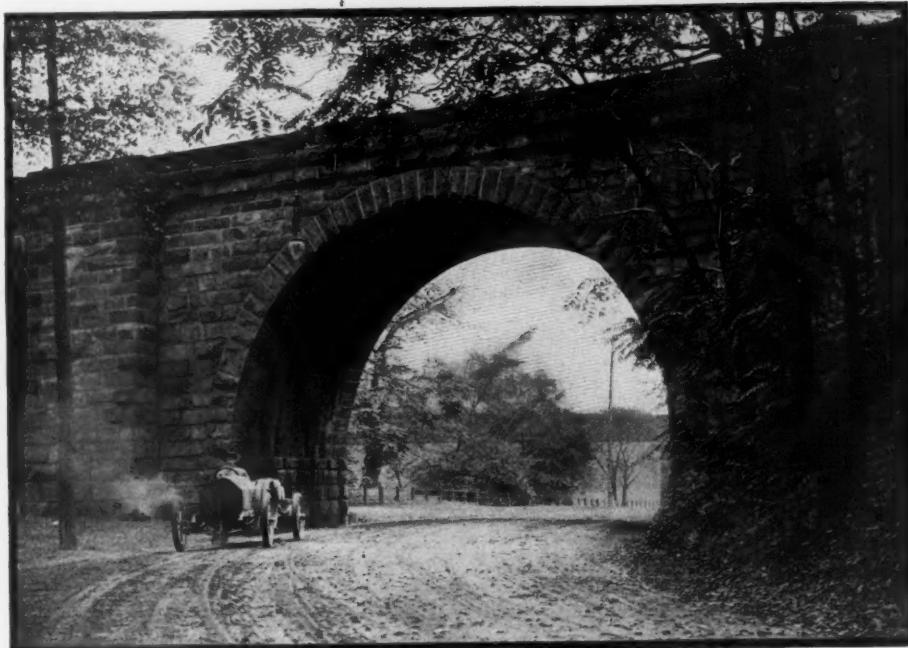
*Herb Lytle's substitute not yet named.



ROAD JUST BEYOND THE SWEET BRIER INN



SECOND TURN BEYOND THE FIRST BRIDGE



UNDER THE SPAN OF THE RIVER BRIDGE

WOMAN WINS HOOISIER SOCIAILITY RUN

INDIANAPOLIS, IND., Oct. 4—When the summary had been figured out in the first annual amateur sociability run last night, it was found the event had been won by a woman. The winner was Miss Katrina Fertig, who came within 63 seconds of the secret schedule arranged for cars of class B, costing from \$2,001 to \$3,000. Miss Fertig a year ago was one of the few drivers making a perfect score in the reliability run to French Lick Springs and return. The run, which took the place of the annual reliability run, was exclusively for private owners and their drivers. There were no penalties and practically no rules, except that a professional driver must have been in the employ of his employer for at least 30 days before the run. None of the contestants knew the schedule upon which they were supposed to run. There were four classes, and Robert B. Kramer, of Attica, arranged a schedule for each class. This was kept sealed until after all of the cars had returned to this city, and there was much surprise, when it was found a woman had won. Almost ideal weather and road conditions prevailed.

The run was to Mudavia Springs and return, a pretty little resort in northern Indiana, 5 miles from Attica. The outbound route was 83 miles long, going through Crawfordsville, New Richmond, Newton and Attica. Returning, the route was 104 miles, through Lafayette and Lebanon. There were four classes of entries, as follows: Class A, cars selling \$3,001 and over; class B, cars selling \$2,001 to \$3,000; class C, cars selling \$1,001 to \$2,000, and class D, cars selling at \$1,000 and under. The running time for the different classes was: Class A, going 3:38:09, returning 4:54:21, total 8:32:30; class B, going 3:58:24, returning 5:19:09, total, 9:17:33; class C, going 4:23:35, returning 5:38:42, total 10:02:17; class D, going 4:50:03, returning 6:02:11, total 10:52:14. The results:

CLASS A—SCHEDULE, 8:32:30

Car and Entrant	Time
Packard 30, H. A. Archey	8:25:30
Packard 18, F. L. Wilshire	8:16:30
Stoddard-Dayton, Carl G. Fisher	Withdrawn
Locomobile, L. M. Wainwright	9:14:20
Stearns, J. T. Alfree	Withdrawn
Packard 18, W. A. Atkins	7:31:03

CLASS B—SCHEDULE, 9:17:33

Premier, George A. Weidley	9:56:30
Premier, Miss Katrina Fertig	9:16:30
Knox, E. H. Wilson	Withdrawn
Premier, E. E. Stafford	9:07:00
Premier, L. W. Cooper	10:12:13
Premier, Bert A. Boyd	9:59:05
Premier, Miss Elizabeth Love	9:43:00
Premier, Mrs. Frank Schussler	9:38:30

CLASS C—SCHEDULE, 10:02:17

3-M-F, J. Rotbart	9:01:30
Overland, John A. George	Withdrawn
3-M-F, H. H. Hauger	Withdrawn
Oakland, Herbert Herff	Withdrawn
3-M-F, Joseph T. Elliott	8:48:32

CLASS D—SCHEDULE, 10:52:14

Maxwell, John Hayden	9:32:00
Hupmobile, F. I. Willis	10:35:30
Empire, Paul Smith	Official car

The prize was awarded to the driver of any class keeping closest to the schedule in his class. The prize was a silver trophy

donated by the Warner Instrument Co., which is to be contested for each year, unless one person can hold it 3 years in succession, in which event he is to retain possession of the trophy. There were a number of accidents, but fortunately none of them was serious. On Saturday the Stoddard-Dayton confetti car No. 13, driven by Barrett Saltzgaber, ran into a ditch between Crawfordsville and New Richmond and was wrecked. Mr. Saltzgaber was only slightly injured and the Packard car, driven by H. A. Archey, picked up the crew of the confetti car and carried it into Mudavia.

Immediately after arriving at Mudavia, dinner was served at the hotel at the resort. This was followed by a hill-climb on the Devil's Elbow hill, which is about 1,030 feet long and ranges from a 9 to a 15 per cent grade. At the expense of Mr. Kramer, of Attica, the hill was graded and the turns banked, and a timing device was furnished by H. J. Seonce, of Sidell, Ill. Cars of each class participated in the hill-climb. The winners of the various classes then entered a handicap climb, the winner of this receiving a silver cup. The event was won by Carl G. Fisher, driving a Stoddard-Dayton. The following is a summary of the hill climb:

CLASS A

Car and Driver	Time
Stoddard-Dayton, Carl G. Fisher	:20
Stearns, J. T. Alfree	:22 1-2
Locomobile, L. M. Wainwright	:27 1-4

CLASS B

Knox, E. H. Wilson	:22 3-4
Premier, Miss K. Fertig	:27 1-4
Premier, Mrs. F. Schussler	:35 1-4

CLASS C

Buick, Dr. P. H. Keys	:25 1-2
Oakland, Herbert Herff	:25 3-4

CLASS D

Maxwell, John Hayden	:28 3-4
Hupmobile, F. I. Willis	:43 1-2

FINAL HANDICAP CLIMB

Car, Handicap, Driver	Time
Stoddard-Dayton, scratch, Fisher	:19 3-5
Buick, :05 1/2, Keys	:28 3-5
Knox, :02 3/4, Wilson	:23 4-5
Maxwell, :08 3/4, Hayden	:30

RUSH FOR PALACE SPACE

New York, Oct. 1—All records have again been broken in connection with the applications for space in the show which will open New Year's eve in Grand Central palace. When the applications for space to participate in the first allotment closed last Friday 110,000 square feet had been applied for, which is about 5,000 square feet more than was applied for last year. With but 72,000 square feet at their disposal Chairman R. E. Olds and his associates on the show committee will experience considerable trouble in satisfying the demands of motor car and accessory exhibitors. Members of the A. M. C. M. A. have fairly swamped the management with requests for increased space and members of the Importers' Automobile Salon have taken every foot contracted for by that association. David J. Post, who represents the motor and accessory

association on the A. M. C. M. A. show committee is authority for the statement that members of his association have applied for 25 per cent more space for the palace affair than at any previous exhibition. The drawing for space will be held at the headquarters of the A. M. C. M. A., 505 Fifth avenue, New York, at 10:30 o'clock Friday, October 8, when members of the A. M. C. M. A. will select their space. After the drawing of A. M. C. M. A. members the show committee will first allot space to motor car makers not members of the A. M. C. M. A., after which accessory makers not members of the M. and A. M. will have their space allotted.

SPEEDWAY MEET NOVEMBER 1

Indianapolis, Ind., Oct. 4—Another motor car race meet will be held at the speedway November 1, and will be the first on the brick pavement, now under construction. It is believed the new pavement will offer great opportunities for breaking all of the speed records made at the August meet. Features of the coming meet will be the 25-mile race for the Remy brassard, held by Barney Oldfield, and which carries with it a salary of \$75 a week. Several events of from 1 to 100 miles will be held.

ATLANTA SPEEDWAY COMPLETED

Atlanta, Ga., Oct. 4—The \$300,000 2-mile speedway of the Atlanta Automobile Association was turned over to the owners by the contractors Saturday and this morning the experts of the Standard Oil Co. began their work of oiling the track. This work will probably consume 1 week's time. On Monday, October 11, the track will be ready for the racing men, and about the 15th George Robertson, Basle and de Palma will have their cars on the track, to give it its first official test. The management is determined that there shall be no imperfections in the track if they can possibly be avoided, and it is with this object in view that they have secured the services of these drivers to visit Atlanta and make an inspection for them. The work on the grand stands is progressing to such an extent that they are today ready for occupancy.

GOOD DAY FOR THE BUICK

Milwaukee, Wis., Oct. 4—A model 16 Buick won the 50-mile Milwaukee motor derby in 53:11%, Saturday. The winning car had been loaned to the entrant, the Bates-Odenbrett Co., by Judge James Madison Pereles, and was sent in without special preparations, being geared as usual and being simply stripped. The same Buick won the opening event of the annual race meet of the Milwaukee Automobile Club at State Fair park, a 10-mile event open to stock chassis listing \$1,251

to \$2,000; won the 50-mile derby, originally intended as a 100-mile race, and then with the same tires and no repairs, held the lead in the 10-mile event for stock cars listing \$2,001 to \$3,000 for 7 miles and was forced to withdraw on account of a broken connecting rod. The opening 10-mile event was stopped during the ninth mile because of an accident to the Petrel. The time for the 8 miles for the Buick was 8:01 1/2. John Heber drove the car alone in all events. A 1908 model 10 Buick, owned and driven by Douglas Petit, a 19-year-old youth, son of the president of the Wisconsin National bank, won the 5-mile event for stock chassis listing \$850 to \$1,250 in 6:10 1/2%. The meet was attended by 8,000 people, which is considered remarkable as the meet was held on just 1 week's notice. The regular annual 2-day meet, including a 24-hour event, was scheduled for September 24 and 25, but had to be called off, and the insistent demands of dealers obliged the club to hold a 1-day meet. In the opening event a six-cylinder Petrel, driven by Fred Schwaders, of Milwaukee, with Christ Paulson, of Kenosha, as mechanic, dashed through the fence at the first turn, while starting the ninth mile and was wrecked. Both were seriously injured. Bob Drach, of Chicago, experienced some downright hard luck in the 50-mile race. The American led for 6 miles. Summaries:

Milwaukee Motor Derby, free-for-all, 50 miles—Heber, Buick, won; Nelson, Pope-Hartford, second; Fierce, Falcar, third; Drach, American, fourth; Magoon, Pope-Hartford, fifth. Time, :53:11 3-5.

Ten miles, for stock chassis listing \$2,001 to \$3,000—Nelson, Pope-Hartford, won; Heber, Buick, second. Time, 12:28.

Ten miles, for stock chassis listing \$1,251 to \$2,000—Heber, Buick, won; Pearce, Falcar, second. Time, 8:01 1-5. Race called in ninth mile because of accident.

Five miles for stock chassis listing \$850 to \$1,250—Petit, Buick, won; Miller, Hupmobile, second. Time, 6:10 2-5.

RACING AT SANTA ANA

Los Angeles, Cal., Oct. 2—Special telegram—Five thousand people watched the running of the races at the Santa Ana track this afternoon, the afternoon's sport being concluded without an accident. The feature race was the 50-mile open in which the Pennsylvania distinguished itself by beating the Corbin and Royal Tourist. Summaries:

Five-mile for cars with piston displacement over 231 inches—Corbin won; Buick, second; Oldsmobile, third. Time, 5:22 1-5.

Five-mile for 161-230 class—Buick won; E-M-F, second; Tourist, third. Time, 6:04 3-5.

Twenty-five-mile for 161-230 class—Buick won; E-M-F, second; Tourist, third. Time, 18:10.

Fifty-mile open—Pennsylvania won; Corbin, second; Royal Tourist, third. Time, 55:48.

PICKENS AND STRANG QUIT BUICK

New York, Oct. 6—Special telegram—William H. Pickens, who managed the Buick racing team all season, is reported to have resigned his position to become racing manager for the Benz Import Co., which will organize a strong team. Also it is stated that Lewis Strang has left the Buick to drive an Isotta.

Big Floral Parade Held by Washington Motorists

Washington, D. C., Oct. 1—The largest crowd that has ever witnessed a local event in this city turned out yesterday to view the motor car floral parade given under the auspices of the chamber of commerce. It is estimated that more than 200,000 people lined Pennsylvania avenue and the plaza in front of the capitol, and while numerically and artistically the parade was not equal to the one recently given by a local paper, it demonstrated that Washingtonians are interested in pageants, and the parade is sure to become an annual event.

The parade formed on the ellipse in the rear of the White House and passed down Pennsylvania, around the capitol and up Pennsylvania avenue to the Potomac speedway, where the judges were stationed. The judges were Mrs. Claude Swanson, wife of the governor of Virginia; Mayor J. Barry Mahool, of Baltimore; Mayor Philip Breitmeyer, of Detroit; Acting Postmaster General Grandfield, and Commissioner H. B. F. Macfarland. The parade was headed by the car of William D. West, president of the Automobile Club of Washington, who was the grand marshal. Cars containing other officials followed. The parade proper was headed by the cars that competed in the Munsey reliability tour. The cars were covered with mud and the drivers, observers and passengers wore the travel-stained khaki clothing used on the tour. Decorated electric machines came next, followed by those in the gasoline division. Flag-decorated cars came next, with the commercial vehicle section bringing up the rear. The sweepstakes prize, a \$600 rose bowl, was won by a float entered by the employees of the naval gun factory. The vehicle was a 5-ton Studebaker truck, which was decorated with American Beauty roses and laurel leaves. It was covered with white muslin. On top of it were mounted one 3-inch gun in the center, and four 1-pound guns on the four corners, with half a dozen blue jackets in full uniform to man them. The first prize for cars decorated with natural flowers only was won by Harry Wardman, whose Pope-Toledo was designed as a Venetian gondola and decorated with pink and white chrysanthemums and dahlias.

The rose-decorated Waverley electric driven by Mrs. T. B. Spence, was an easy winner in the class for flower-decorated electric machines with women drivers. The car was fashioned in the shape of a huge basket filled with pink roses. The first prize for the handsomest floral-decorated cars in the gasoline division was won by the entry of the Auto Livery Co. The prize for the most unique car in the parade was won by the Washington Post entry. A big Packard truck was used to represent the top of the world, America, Asia, Africa, Europe and the north pole being rep-

resented. The design was half a globe. Against a background of white sheeting were thousands of yards of southern smilax. The other first prize winners were: Float of Draughton's Business College in the commercial vehicle section; the taxicab of the Federal Taxicab Co. for flag-decorated cars; the Waverley electric of W. W. Chiswell in the division for electric cars driven by men, and having floral decorations. Twenty-eight prizes in all were awarded in the seven divisions.

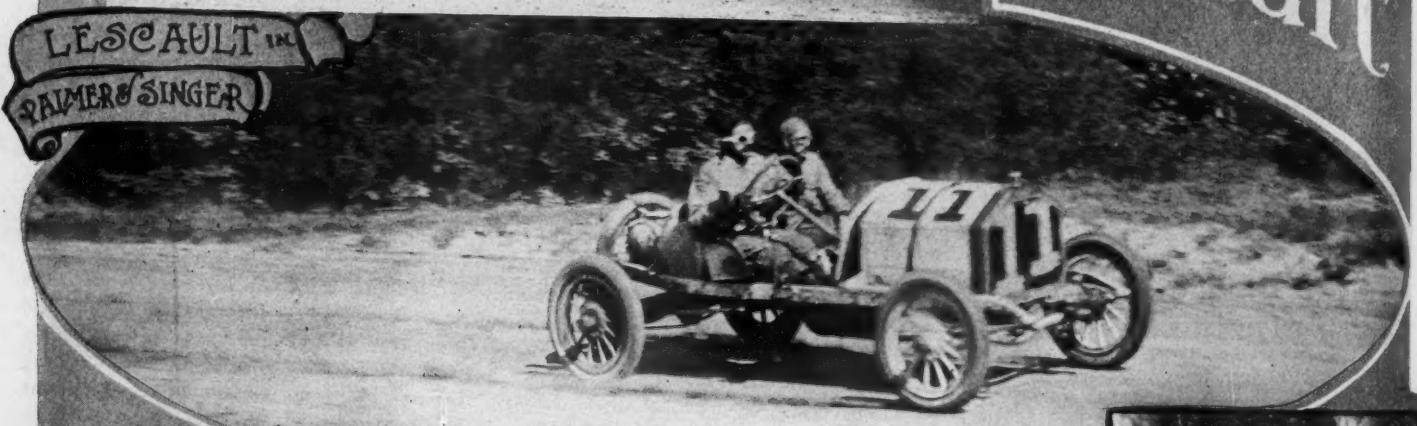
BANQUET GIVEN BY WILLYS

Toledo, O., Oct. 2—In the large banquet room at Toledo Club last Saturday night a dinner was given as a compliment to John N. Willys, president of the Overland-Willys Automobile Mfg. Co.; President Isaac Kinsey, of the Kinsey Mfg. Co., and President Thomas W. Warner, of the Warner Mfg. Co., heads of three immense plants which have come to the city within the past few months. The occasion was made brilliant by the presence of 100 of Toledo's business and professional men. Attorney Clarence Brown acted as toastmaster and in introducing President Willys said that he had informed him that the company will ultimately turn out eighty cars a day, and do a business amounting to about \$16,000,000 annually. President Willys spoke enthusiastically of Toledo and its advantages as a manufacturing center. Interesting addresses were also made by Isaac Kinsey, Thomas W. Warner, W. H. Brown, of Indianapolis, vice-president of the Overland; Manager Baker, of the Overland sales department; A. A. Atwood, of the Atwood Automobile Co.; Rev. George Dugan, pastor of Collingwood Avenue Presbyterian church, and George W. Stevens, director of the Toledo Museum of Art.

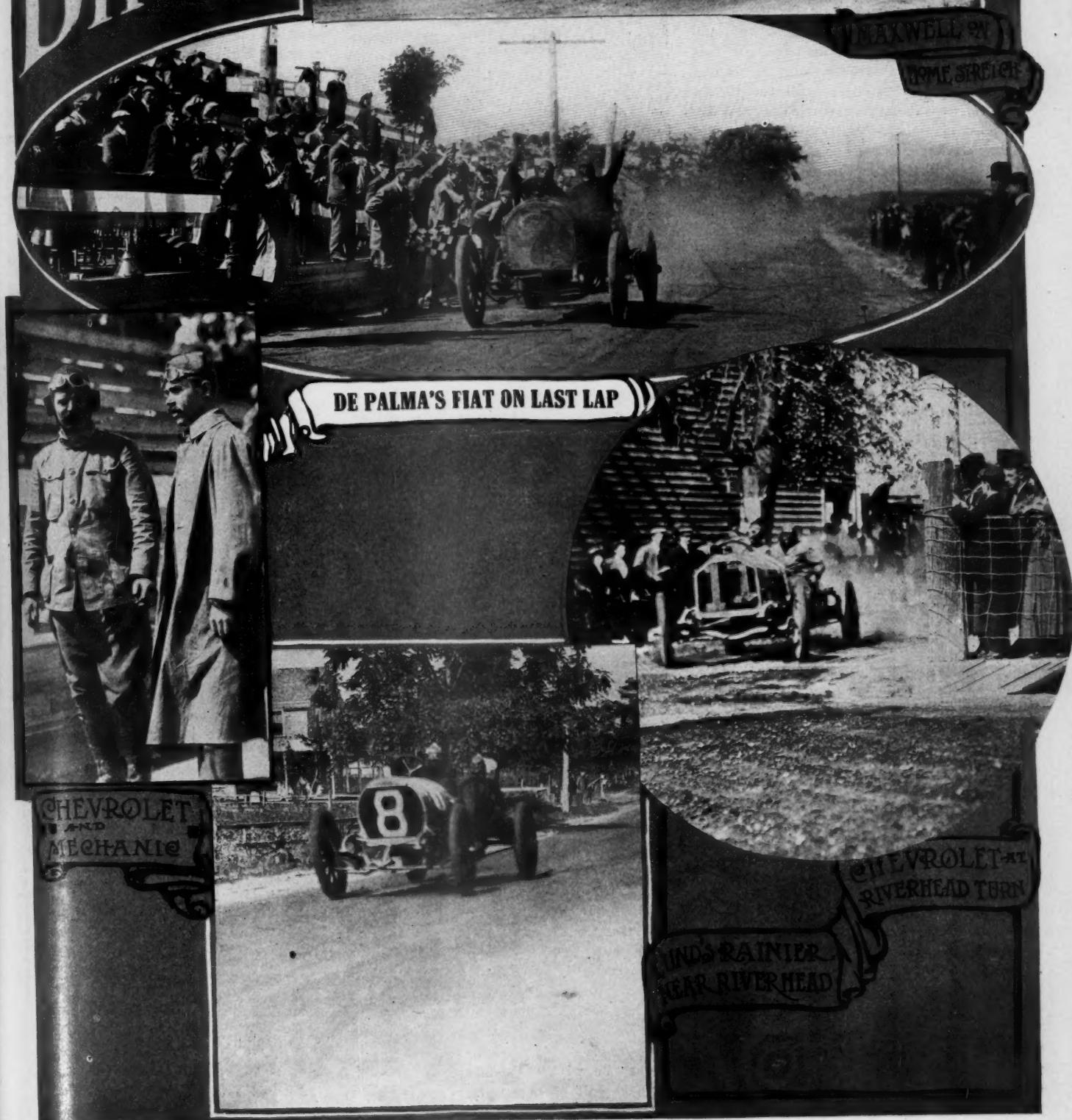
POPE MAKES GOOD REPORT

Hartford, Conn., Oct. 4—A report of the reorganized Pope Mfg. Co. shows that during the period from December 24, 1908, to July 31, 1909, the net earnings of the concern have been \$482,866. Under the heading of assets there are listed real estate, equipment, plant and patents valued at \$5,194,835. The total assets of the company, according to the report, approximate \$6,910,414. Commenting on the report Albert L. Pope, president of the company, says: "The company began operations on December 24, 1908, taking possession of its properties on that date and has operated during the period only the factories at Hartford, Conn., and Westfield, Mass., the other properties taken over being offered for sale and the manufacturing business therein transferred to the operated factories or liquidated. In the reorganization of the Pope Mfg. Co. underwriting notes amounting to \$800,000 were issued, all subscribed for, to provide funds necessary for the purchase of the properties and working capital for operations."

Riverhead Road Race Circuit



Winning Cars and Drivers





The Readers' Clearing House



SPEED OF IGNITION FLAME

NEW YORK—Editor Motor Age—Regarding the communication headed "The Realm of Speculation" in the Readers' Clearing House of last week on the speed of flame propagation in the combustion chamber of a motor, it is difficult to delve particularly deep into this question for several reasons: One of these reasons is that a gasoline motor in operation is subject to a condition which modifies matters in an indeterminable degree; for instance, gas lag, due to friction in the carburetor, intake manifold, and besides around the intake valves, and it is this particular gas lag which makes the necessity for employing a spark advance, as well as a lag in the performance of the functions of the ignition apparatus itself. I hardly think the velocity of the flame under the condition indicated would be more than 2,500 feet per second, if it is as much as that, but even so this is a frightful speed and would mean that the ignition in such a chamber would be practically instantaneous, and it would be the functioning of the different parts forming the ignition apparatus that would cause the necessity for a spark advance, as I have stated hereinbefore.—W. J. Hart, Splitdorf Laboratory.

WASTE CLOGGED CARBURETER

CHICAGO—Editor Motor Age—Experience they say is a good teacher, as was demonstrated to me the other day and which taught me that waste should not be used in attempting to start a cold motor. I had been told that a balky motor suffering from a cold could be conquered by putting a piece of waste saturated with gasoline at the mouth of the air intake to the carburetor. I tried this and sure enough the engine started on the second turn of the crank. But it didn't sound true, there being a whistling noise like an air leak. In six or seven blocks a knock developed, the engine lost its power and I could coax it along only by slipping the clutch. Finally it quit altogether and refused to start again. Reasoning seemed to place the trouble in the carburetor and it occurred to me that maybe a piece of waste had been drawn into it. But the engine would not start even after priming it through the spark plug holes, so that diagnosis seemed wrong. The starting battery then was investigated and found to be dead. Then the carburetor was taken off and a big ball of waste found choking the air tube. That and the dead battery explained it all, and, these troubles remedied, the engine started as usual. It was an odd coincidence that the battery should run out at the same time as the carburetor choked. The former wouldn't have made

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.



GOOD ROADS SCENE NEAR BIRMINGHAM

much difference if it had not been for the waste stopping the motor, for I was running on the magneto, but the difficulty came when I tried to start again. But what I want to know is what caused the knocking? I also would recommend that instead of using waste as an aid to starting a cold motor that either a rag be used or the waste wrapped in the rag before being applied to the air intake.—C. G. Slater.

The knocking was caused by too rich a mixture brought about by the clogged carburetor and the fact that there was not enough air drawn in.

USE THE REO CARBURETER

JEFFERSONVILLE, Ind.—Editor Motor Age—Will Motor Age tell me how to remedy the trouble I am having with my Reo touring car? I do not have trouble climbing hills or getting good speed from my car, but when I cut off the current the machine heats and causes the water to boil. At times, after running a short time and when ready to cut off the current, there is an explosion like a cannon. My car is fitted with a Schebler 1908 model E carburetor. I have reduced the gasoline supply, thinking maybe the mixture was too rich, but when I cut down the gasoline the speed is decreased and when I give it a little extra throttle it refuses to pull as it should. I have a Yankee muffler with a cutout which has always been known to give good results. Can the trouble be with the muffler? I use a Vesta 6-60 volt storage battery. I have reduced the air supply, and also tried in-

creasing the amount through the air valve on the carburetor, but the trouble was not overcome. Although I have had considerable experience with cars I am unable to stop the boiling of the water and the explosions.—C. B.

Your experience, or trouble, is identical with that of other Reo owners who have endeavored to increase the efficiency of their cars by fitting a standard make of carburetor. It is stated by a representative of the Reo company that if it were possible for that company to successfully use a stock carburetor on their cars, it would do so, but being unable to do so, Reo cars are equipped with carburetors of special design. Therefore, it is advisable that you send your Reo carburetor back to the factory, have it overhauled and adjusted, then scrape the carbon from your cylinders and replace the carburetor.

FRiction TRANSMISSION PATENTS

KENOSHA, Wis.—Editor Motor Age—In an article recently sent you by the writer, relating to friction gear for driving, the fact that a patent was granted to J. S. Connelly, of Plainfield, N. J., April 29, 1890, serial number 426,985, was overlooked. A copy of said patent may be obtained by any one, at a cost of 10 cents, from the patent office, Washington, D. C. To those who do not care to go to the trouble of sending for a copy of the patent I will say that the patent was purchased by the Association of Licensed Automobile Manufacturers some time before it expired. The drawings show the rotary driving disk and the driven disk splined to a jackshaft and represents it to be movable lengthwise on the shaft, against the driving disk, in order to get variable speeds. The following are the claims:

No. 1.—In a locomotive car motor, the combination with the driven car wheel or axle and an engine for driving the same, of an intermediate driving mechanism comprising driving wheels or disks relatively movable to vary the position of contact for the purpose of altering the speed of transmitted motion, and mechanism by which the frictional pressure of the driving wheels or disks may be varied, substantially as and for the purposes described.

No. 2.—In a locomotive car motor, the combination with the driven car wheel or axle and an engine for driving the same, of intermediate driving mechanism comprising driven wheels or disks relatively movable to vary the position of contact for the purpose of altering the speed of transmitted motion, and mechanism for so moving the same, movable bearings for one of the wheels or disks, and mechanism by which said bearings may be moved to

vary the contact pressure of the wheels or disks, substantially as and for the purposes described.

No. 3.—In a locomotive car motor, the combination, with the driven car wheel or axle and an engine for driving the same, of intermediate frictional driving mechanism transmitting motion of variable speed, and mechanism for varying the frictional pressure conformably to the variation in speed of the transmitted motion, substantially as and for the purpose described.

This patent expired April 29, 1907. Herman Cuntz, head of the patent department of the A. L. A. M., 7 East 42d Street, New York, N. Y., can substantiate my statements.—C. B. Hatfield.

GETTING CYLINDER VOLUME

Atlanta, Ga.—Editor Motor Age—Will Motor Age give me the formula for obtaining the cubic inches for cylinder displacement on four-cylinder motors?—L. L. Barnes.

The rule is as follows: First secure the area of the piston head, assuming it to be flat, and then multiply by the stroke in inches and the number of cylinders. To get the piston area, square the radius—which is one-half the diameter—and multiply by 3.1416. In a motor with 4-inch bore the radius is 2 inches and the piston area becomes $2 \times 2 \times 3.1416$. Next multiply by the stroke and number of cylinders.

USING TWO IGNITION SYSTEMS

Chicago—Editor Motor Age—I can bear out the statement of M. A. Stiles of the Atwater Kent Mfg. Works that “gas does require an appreciable amount of time—to ignite—has been conclusively demonstrated by the fact that two spark plugs set in opposite sides of a reasonably large cylinder will materially hasten complete combustion of the explosive mixture.” My four-cylinder National, with bore and stroke each $4\frac{1}{4}$ inches, has a T-head motor and is fitted with two separate sets of plugs—one over the intake valves and the other over the exhaust valves. A Bosch high-tension magneto furnishes current

for the first-named set, and a storage battery, Connecticut single-vibrator coil and Leavitt distributor cares for the second set. Ordinarily the magneto alone is used, but much better results may be obtained by using both systems at the same time, as they are timed together. By setting the throttle so the car is traveling, say, 16 miles an hour on a good road, using only the magneto, and then plugging in the battery system, will increase the speed to about 20 miles an hour. It is plain that there is an approximate increase in mileage on a given gas charge of 25 per cent. In addition, there is an appreciable lessening of the noise from the exhaust, illustrating the fact that more of the charge is burned. On a recent run to Indianapolis, carrying two people and some 300 pounds of baggage and confetti used to mark the road for a number of tourists, I drove from my home to Chicago and then to Rensselaer, Ind., a distance of a little over 100 miles, on just 5 gallons of fuel. I used both ignition systems, but I have never secured such mileage using only one system.—Charles P. Root.

FRICITION TRANSMISSION SLIPPING

Syracuse, N. Y.—Editor Motor Age—Referring to the communication from Richard Wagner in the Readers’ Clearing House, September 30, page 19, relative to the slipping of the friction wheel of his Waite friction drive. If Mr. Wagner will buy 5 cents worth of fuller’s earth, put the friction wheel at the center of disk in contact, and, as it is advanced to the periphery of the disk, pour the fuller’s earth on the wheel at point of contact, he will find the result will be all that can be desired.—G. D. Wilcox.

POWER FOR 32-INCH WHEELS

Muscatine, Ia.—Editor Motor Age—Can Motor Age inform me which takes the more power to climb sand hills at the same rate of speed, both cars equipped with everything the same, excepting one has 32-inch wheels, the other 34-inch wheels? Can the gears be so arranged that they will climb at the same speed, with same engine

and using the same power, or will the car fitted with 34-inch wheels run faster or require more gasoline?—A. J. Weaver.

More power will be required for the 34-inch wheels providing the gear ratio in each is the same. Each revolution of a 34-inch wheel will take the car 106.8 inches up the hill as compared with 100.5 inches for each revolution of a 32-inch wheel. There is a difference of 6.3 inches, and a car cannot be taken even this short distance up without effort. The result is that if the motor makes five revolutions to each one of the rear wheels it must do more work for a revolution of the 34-inch wheel than for the 32-inch one. By changing the gear ratio the work performed by the motor can be maintained the same for each.

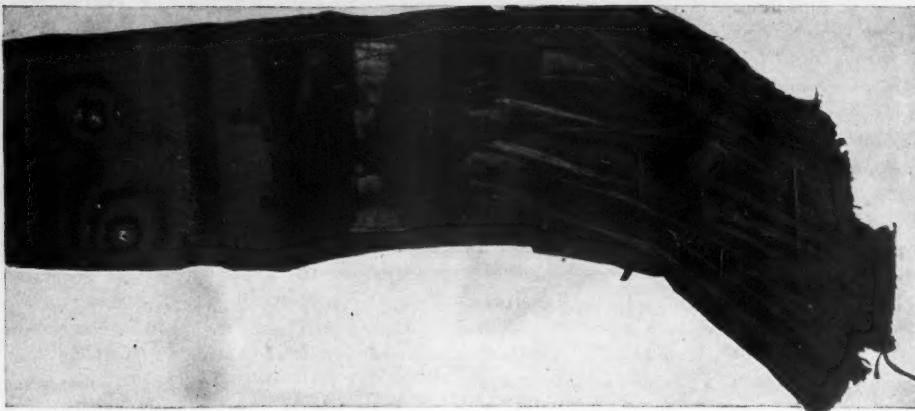
USING TOO MUCH CURRENT

Nevinville, Ia.—Editor Motor Age—I am having trouble with my 14-horsepower Maxwell runabout. The engine misses when going uphill on the high gear, runs nicely on low gear. The ignition parts are in fine shape—fifteen new cells connected in series-multiple, a new commutator, and the wiring is good. The carburetor has been taken off and cleaned twice. I have tried adjusting it in every way possible. When the motor is stopped from fifteen to twenty drops of gasoline drip from the air intake, then they stop. Can Motor Age inform me what is the trouble and how to remedy it?—W. E. Hoskins.

You say you are using fifteen new cells connected in series-multiple. If this is true you are using too strong a current, and your motor is missing because the platinum points on the vibrators and contact screws are badly burnt and pitted. Five cells in series are all that are required for your ignition systems and the use of more is detrimental; for although they will for a short time give a more intense spark, you will find the constant replacement of contact points very expensive and annoying. Renew the contact points of your coils and use but five cells at a time and you probably will have no more trouble from this source for some



NEW STATE HIGHWAYS NEAR BIRMINGHAM, ALA., WHICH ARE ENJOYED BY MOTORISTS



EXAMPLE OF PIERCE-ARROW SECOND-GROWTH HICKORY SPOKE

time. As to the slight temporary leaking from the air intake of the carburetor whenever the motor is stopped, this is probably due to a very high float level, which renders the spraying nozzle very sensitive, so that several drops of gasoline are sucked from the nozzle by the last few slow revolutions of the motor after the ignition is cut off, and as there is not sufficient force in this suction moment to vaporize the gasoline it runs out through the air intake pipe. To overcome this trouble a new float probably would be necessary, and as the adjustment is permanent the carburetor would probably receive the most expert attention at the Maxwell factory.

BIRMINGHAM GOOD ROADS

Birmingham, Ala.—Editor Motor Age—I am sending herewith three pictures showing the good roads around Birmingham. We have about 10 or 12 pikes like this leading into the city, from 16 to 25 miles in length. It is our intention to send out on October 3 three scouting parties, or pathfinders, to locate good roads from this city to Atlanta. There is a great movement on foot all through the county for good roads.—George W. Harris.

SOME CAUSES OF SKIDDING

Paducah, Ky.—Editor Motor Age—Through the Readers' Clearing House will Motor Age state the various causes of skidding?—A. Reinhart.

Is it assumed from your inquiry that you refer to peculiarities in chassis or body design that lead to skidding, and not to the general cause of skidding? Excessive weight back of the rear axle will invariably result in skidding to a greater or less extent. Body weight at this point when on a turn becomes a force on a lever to whip the car around. Solid tires are worse for skidding than pneumatics. The most frequent causes of skidding are too great speeds on curves and braking on slippery surfaces. Skidding is always caused by some force interfering with the straight-ahead movement of the car. At one time this force is the turn movement of a car on a curve and at another time the braking action. Soft spots in roads, either of sand or mud, cause bad skids. In such cases the adhesion between these spots and the tires is less than the side

sway or whip of the car at that instant, the result being the side whip or sway takes control, and the skid begins. Skidding is never a mere accident but always a result of lateral forces. In striking a soft spot it may be the drop of the car into the spot that causes the side sway.

FORD COAST-TO-COAST CAR

Gotebo, Okla.—Editor Motor Age—I have been having some argument with reference to the race from New York to Seattle which was won by the Ford. In numerous advertisements by the Ford people since the race they claim that they only used the one set of tires in the entire distance and that two of the tires went through without a puncture.

1—Is there any way of knowing whether the car that won the race was the car that originally started in the race and if so was it the one that started which won?

2—Did they make the entire distance on the same set of tires with which they left New York?

3—Did two of the tires on the car make the entire race without a puncture and without inflation?

I am not connected with the motor car industry and do not wish to use this information in any way to the detriment of any car or make of tires.—John M. Kirkwood.

The Automobile Club of America stamped many parts of the cars before leaving New York and took accurate measurements of where the stamps were placed and their exact nature. Wax im-

pressions of these stamps were forwarded to Seattle so that the examiners could ascertain absolutely if the parts bore the genuine stamps they received in New York. Motor Age has no definite record on the tires used in the test or was any official check used on them.

BATTERIES IN MOTOR BOATS

Chicago—Editor Motor Age—Users of motor boats have come to the sensible conclusion that magnetos are essential parts of the ignition system in conjunction with batteries. In fact, two sources of current supply seem more essential in boats than in motor cars, because ignition failure may mean trouble. Dry-cells can, however, be thoroughly protected from leakage, short-circuiting and dampness by a simple remedy. A wooden box should be provided which will comfortably take the cells. Paraffine should be melted and poured into the bottom to the depth of $\frac{1}{4}$ inch. Then the cells should be placed in position on the paraffine after it has hardened. The cells should not touch one another, however. Paraffine can now be poured in so as to fill all remaining space and $\frac{1}{4}$ inch over the tops of the cells. This will hold the cells in place and thoroughly waterproof them as well.—Charles P. Root.

GOOD WHEEL SPOKES

Buffalo, N. Y.—Editor Motor Age—Wood used in spokes of wheels must be of selected grades, preferably second growth hickory, and the problem is to make a good selection even when men of experience are put to the task. Of course, there are certain earmarks which will distinguish good from inferior wood, but there is no well-defined line of demarcation by which the line can be sharply drawn when the border of quality is reached. When a car is wrecked if the wheels are destroyed, it is then that the quality of the wood used in the wheels can be ascertained to a certainty, and two illustrations show just such a wheel. This wood came from a Pierce-Arrow car after a locomotive got through with it, and while there was absolutely no reason why the wheel should have stood the strain, even so, the character of the fractures is that due to second growth hickory of the best selections and it is interesting as an exhibit on this account.—T. J. Fay.



PIERCE-ARROW SECOND-GROWTH HICKORY SPOKE AFTER A WRECK

TWO TIRE MAKERS ON THE PRICE SITUATION

NEW YORK—Editor Motor Age—In August and September, 1908, when the reduction in tire prices was being agitated, we were one of a few companies which opposed the making of any extreme cut, but in the trend of events a general reduction in the selling prices of tires of 25 per cent was made by all tire companies. This reduction was made in the face of what was termed a bad business year for almost every business and owing, of course, to the panic conditions prevailing in many lines of business, the selling prices of crude rubber naturally were somewhat low. It was only to be expected, with conditions as they existed at that time taken into consideration—at least we so believed—that upon a resumption of business activities in general, the cost of crude rubber would surely be increased by the general selling agents as soon as the demand again became healthy. Virtually at the time tire prices were reduced—on or about September, 1908—the market values of crude rubber were beyond what it was estimated they would be by such companies as desired to reduce prices. A steady increase in the cost of crude rubber since that time has made apparent a distress in the manufacturing of tires in many ways with one of which the buying public has become acquainted through the two very recent advances made in the selling prices of tires approximating 25 per cent or more.

The policies of the various tire companies differ greatly. The general information extended to the motoring public has been more or less confusing, causing the almost universal belief among the users of tires that enormous profits were to be made in the manufacturing and selling of motor car tires and that the reason for the present advancing of prices was due to an understanding between the different tire manufacturers. That there is no understanding between the manufacturers of tires should be apparent to all interested and the proof of this statement can readily be gained if the present strong competitive policies of the different tire companies are considered.

There probably is no part of the motor car industry, viewing it as a whole, so abused or misunderstood as that which pertains to the manufacture of tires—and wrongfully so. If a compilation of statistics could be made covering the enormous expense the tire companies have been obliged to incur for the good of the industry and in educating the motoring public regarding its product, they would be shown much greater consideration than is extended them today. The adjusting of tires as it is understood, has been a great expense to every tire company, and let me say right here that 75 per cent of the expense caused tire companies on account of making adjustments of tires is borne by them for reasons herein mentioned. In

other words, plainly speaking, the tire manufacturers have paid for their experience very dearly and are educating the motoring public and are continuing to do so, in the use of their product at their expense.

When you consider that motoring is a sport that allows of one riding on air, and that a pneumatic tire, in making a comparison of it with steel, is probably the most delicate part of a motor car, it is not hard from the tire manufacturer's position for him to prove that the advancement of the art of manufacture of pneumatic tires has reached a very advanced condition, and if the motoring public would pay more attention to what the tire manufacturers suggest to them in taking care of their tires and be more careful not to abuse them, much greater mileage would be obtained than the average motorist finds he is receiving today. On account of the misunderstanding and abuses to which tires have been put, the tire manufacturers have, plainly speaking, returned to the purchasers of their wares, in the aggregate, hundreds of thousands of dollars—a condition never known in any other business and not looked for by the purchaser in buying other material.

The under-tiring of motor cars and the carelessness with which tires are used never has been more seriously considered by the manufacturers of tires than it is today, and the load they have carried and are carrying is one that no other industry has ever been obliged to bear. The truth is that the tire manufacturers of America appreciate that in the purchase of a pneumatic tire the consumer has a great deal to take for granted and therefore he feels that he is honor bound to manufacture it to the best of his ability that no unfair advantages may be gained.

Concluding, the present prices asked for pneumatic tires are not out of proportion, neither are they as high as they should be considering the present cost of the material out of which they are manufactured, and with these conditions prevalent, the motorists of America surely should refrain from any criticism, but to the contrary, they should become more attentive and more readily believe what they are told, and appreciate that the tire manufacturers have in the past and are today doing more to promote the motor car industry and its success, at an enormous expense to them, than any other associate manufacturer of the industry taken as a whole.—J. M. Gilbert, General Manager Continental Caoutchouc Co.

FIRESTONE ON TIRE SITUATION

Akron, O.—Editor Motor Age—The tire situation as it relates to the crude rubber supply is more serious now than ever before in the history of the industry and the outlook for the coming year promises no relief. This is owing to the fact that

the price of crude rubber is advancing beyond all precedent and rubber for immediate delivery is practically cleaned out of the market. All manufacturers are affected alike, inasmuch as no rubber manufacturers control any portion of the source of supply, but are compelled to buy their crude rubber for manufacturing purposes in the open market.

Most of the rubber used in high-grade tires comes from the Para and Ceylon districts. The former district is up the Amazon river, chiefly within the borders of Brazil and Bolivia, and the rubber is harvested from wild trees. The Ceylon district comprises Ceylon and adjacent islands, where the rubber is gathered from extensive plantations. Some rubber comes from Mexico, the western coast of Africa and scattered portions of South America, but this is of inferior grade and unsuitable for use in the manufacture of high-grade motor car tires.

The Brazilian government practically controls the price of Para rubber which has risen from 67 cents a pound in February, 1908, to \$2.15 for immediate delivery. This season's crop is now being harvested and is slow in coming down the river; meanwhile present stocks are being depleted and the new crop will be snapped up as rapidly as it finds its way into the market. The enormous demand for fine crude rubber is not to be wondered at when it is remembered that the 1909 output of motor car tires amounts to nearly \$30,000,000. So great has been the increased demand from this source that tires are now the chief means of consumption, having superseded rubber boots and shoes in the relative amount of fine rubber used.

The remarkable increase in price is largely accounted for by the unprecedented demand, coupled with the fact that production has not materially increased. During the low prices of the panic and the months following, the Brazilian government in order to protect the rubber-harvesting syndicates from failure, advanced them large sums of money and granted them other concessions which enabled them to keep their rubber off the market temporarily. When the demand quickened with restored business activity, they were able to steadily and rapidly boost the price. American manufacturers have had to stand their full share of the additional cost inasmuch as they take about half the Para output. The production of crude rubber throughout the world has been increasing an average of about 11 per cent yearly, which is not sufficient to keep pace with increased demand and it will probably be several years before enough plantations come into production to bring back the price to near where it has averaged for the past few years.—H. S. Firestone, President Firestone Tire and Rubber Co.

NOTES ON TIMING OF GASOLINE MOTORS

By Thomas J. Fay

EVERY motorist, when he finds his motor limping on a hill, naturally assumes that the timing may have gone awry, and in order to ascertain the facts he must investigate the timing to be sure of his premises. While he is at it no more time will be consumed if the valves are examined to see if they are tight, and the two possible sources of trouble may therefore be disposed of at the one time. To a motorist who may not be very familiar with motors and the process there is a good chance to do more harm than good, and makers, recognizing this state of affairs, go to quite some pains to afford a due measure of information in relation to this phase of motoring.

Of the several methods to pursue it is very likely that the plan offered by the E. R. Thomas Motor Co. will be found of much value and so simple that a motorist of almost no skill should be able to do the work and arrive at the right conclusion. Since the cams cannot be shifted by the motorist, and since they fix the relations between the respective cylinders as respects the intervals between the opening of the valves, excepting for a small difference, which is represented by the range of adjustment of the lifts, it is not necessary for a motorist to become confused merely because there are two, four or six cylinders to handle instead of one.

Timing Must Be Same

The timing of any number of cylinders must be the same as for one, and the instructions will hold for all cylinders excepting that the order of firing when given must be properly observed. In a six, for illustration, if the order of firing is given as 1-4-2-6-3-5, this order of firing must be maintained, and if a motorist does not understand about the mode of connecting up the electrical system the best way for him is to tag the connections so that he will be able to replace them in the proper order, or leave them undisturbed.

Every motorist should ascertain from the maker of his car the order of firing, and with a very little trouble on his part he will be able to trace out the connections and become capable of checking the electrical connections at a moment's notice thereafter. The order of firing is not the same in all sixes or all fours; the only thing that cannot be done is to fire two cylinders in succession in which the cranks lie in the same angular position.

The question is frequently asked, What is the best timing? If there is such a condition that is common to all makes and designs of motors why do not all makers of motors adopt a standard? Then the question of fixed ignition, adjustable spark advance, serves as a bone of contention, and motorists naturally want to know the advantages of the one over the other.

Were all makes of motors alike in certain respects it would be quite possible to ascertain the best timing and fix upon a standard to go by. The several motors differ from each other as follows: Compression is not the same; ratio of bore to length of stroke differs; conditions of scavenging are not the same; cubical displacement is not the same; carburation is not on a common basis; ignition is not equally effective; cooling is not equally effective.

Taking the above factors in order of their naming conclusions as follows will approximate the reasons why motors may not all be timed the same:

If the compression is high the mixture will inflame at a more rapid rate and it is not desirable to advance the spark so much; the terminal pressure will be higher and it is not necessary to open the exhaust valve so early.

If the stroke is long in comparison with the bore the time allowed per cycle will be longer and the mixture will be more homogeneous, hence more inflammable, and the spark will not have to be advanced so much as when the stroke is relatively short.

If the exhaust valves are relatively large and if the exhaust opens early, provided the back pressure caused by the muffler is not in excess, it is self-evident that the mixture will burn more readily, and the spark will not have to be advanced so much as when the reverse conditions hold. Then, with this well-scavenged condition, if the inlet valves are relatively large, provided the carburetor is big enough to do the work without inducing a considerable depression, the terminal pressure will be relatively high and the exhaust valve will not have to be opened so early.

If the cubical displacement is relatively great the distance the flame will have to travel in a given time will be greater and the time may have to be lengthened, which is a matter of advancing the spark.

Carbureters Also Differ

All carburetors are not the same, and even good carburetors may be too large or too small for a given motor. Under such conditions it may be that the depression will be excessive, or the reverse, and the mixture may not be homogeneous. If globules of liquid fuel go into the cylinders rather than gas it is impossible to realize the same results with fixed ignition.

Liquid gasoline must be vaporized before it will make an inflammable mixture, and time must be allowed in which to accomplish this feat.

The competence of an ignition system depends upon the amount of energy set free in the spark, and this is a condition which is far from common between the several systems in vogue. Besides the amount of energy in the spark there is the lag angle to be coped with, and it is far from true that the lag is the same in all systems. In view of the ignition system actually used it is necessary to adjust the angle of advance, and by so doing compensate for the inherent imperfections of the system in so far as it is possible to do so.

That the cooling is not equally effective is of course true, since all cylinders are not of the same size, or are all designed in precisely the same way; moreover, the capacity of pumps vary and radiators differ from each other both in point of efficiency of surface and in the amount of surface available per square inch of flame swept cylinder surface. It follows that the temperature prevailing in the body of compressed mixture, for a given compression, or irrespective of compression will not be the same and the advance of the spark will have to be in accord with the actual conditions obtaining, which makes it impossible to have the angle of advance the same in all makes of motors if the best results are to be realized.

Adjustable Spark Advance

With the valves properly timed, if the spark can be advanced to suit the performance of the motor, and at the will of the operator, provided the energy of the spark is adequate for the purpose, the motorist should have very little or no trouble from this cause. It takes a little practice to bring out the best results, but if the motorist will remember that the spark must be advanced as the speed of the motor increases, independently of any other consideration, he will soon be able to determine the best rate of advance in view of speed.

As a motor slows down, due to loading on a hill, or if the going is bad, the spark must be retarded to suit the lowering speed, and this is a point which is frequently overlooked simply because in the absence of a considerable load the motorist finds that advancing the spark increases the speed, and the same motorist is prone to think that advancing the spark when going up a hill should afford more speed. As before stated, the spark must be retarded as the motor slows down, if the desired amount of power is to be realized, and care must be exercised not to retard the spark so much as to induce a condition of steaming at the radiator.

If the spark is retarded too much the



radiator will steam, and the reason for this is that the gas is not ignited soon enough in view of the travel of the piston in feet per minute, with the result that the highly-heated flame sweeps more surface of the cylinder walls, and more heat is then delivered to the cooling water in the jackets of the cylinders, and this heat is carried to the radiator by the circulating pump in excess of the ability of the radiator to deliver the heat to the air, through the walls of the radiator.

Radiator capacity cannot be estimated on a basis of the horsepower ability of motors, for the reason that the flame-swept surfaces are not the same per horsepower in motors. Motorists are not, therefore, in a position to form any judgment on this point, since to establish the right size of a radiator for a motor it is necessary to determine the flame-swept area of the cylinders and establish a ratio in view of the facts.

Most cooling troubles are due to running on a retarded spark, and good driving consists in a display of skill in the manipulation of the spark advance lever as much as it does in any other way. The penalty for running on a retarded spark is not only in a loss of power; preignition may be one of the troubles, since if the compression is a little high in a motor a little extra heating will bring on preignition, and this little extra heating will come on very quickly if the spark is retarded beyond that which checks with the speed. Excess heat also leads to lubricating difficulties, and it is reasonable to expect that carbon formation in the combustion space will be induced as well.

Referring to Fig. 1, it is desirable to notice the direction of crankshaft rotation, and then observe the direction of spark advance, and of retard. It will be seen that the spark advances against the rotation of the crankshaft, and that, in retarding, the spark is late, since it follows the rotation of the crankshaft. In advancing the spark it is the purpose to locate the ignition at some angle on the compression stroke, preceding the power stroke, such as will allow the mixture to ignite and inflame before the beginning of the power stroke following compression.

Order of Cyclic Rotation

The figure indicates the four cycles in a four-cycle motor, and the order of the cyclic relation is as follows: Suction-induction or inspiration—which, according to the figure, begins at a point A 10 degrees after the top dead center, continues for the stroke, and follows to A1 30 degrees beyond, which is really 30 degrees from the bottom dead center LC, and on the compression stroke. As the figure shows, the inlet valve opens for each cylinder in proper order at 10 degrees late from the top dead center C, and is closed 30 degrees late, from the bottom dead center LC.

Compression begins when suction fin-



ishes, so that, as the figure shows, the compression begins when the inlet valve closes, 30 degrees late from the bottom dead center or at A1. Compression continues to the top dead center, but it should be swelled by inflammation to quite some extent, due to ignition before reaching the top dead center. In the absence of ignition compression would cease just at the top dead center, it would hold constant during the dwell on the center, were not heat abstracted by the cooling medium, and expansion would then go on as the piston falls away from the center on its downward stroke, but the energy residing in the fuel would not be cast adrift and the expansion stroke would not be a power stroke of sufficient force to be of any value.

Power following compression, in view of the above, depends upon ignition in order to set free the energy residing in the fuel rather than a mere expansion of a previously compressed gas. The amount of energy which can be abstracted from the fuel by igniting at the right time, demands that the right time be established, and this is only approximated when a fixed ignition is used. As the figure shows, the power, or explosion, stroke begins at the top dead center C, just when the piston departs from the top dwell point and begins to descend, and continues on for the downward stroke until the exhaust valve is opened at H, which, in this example, is

at a point marked off as 40 degrees early. The reason for opening the exhaust valve so early is in order to allow the spent products of combustion to escape.

Exhaust Follows Power

Exhaust follows power, and begins at H when the exhaust valve opens 40 degrees before the bottom dead center on the power stroke. The part of the exhaust which escapes before the piston crosses the bottom dead center LC, is impelled by the terminal pressure, that is to say, by the pressure of the gas before it is expanded to the atmospheric pressure, and since the exhaust valve opens 40 degrees early the terminal pressure is considerable, possibly 30 pounds per square inch. When the piston crosses the bottom dead center the exhaust stroke begins, and the piston sweeps the spent products before it—all that remain after the 40 degrees of early exhaust opening—up to the end of the piston travel. Since there is clearance in the cylinder, above the piston, it follows that some gas will remain in, and since the pressure of the remaining gas is very low the exhaust valve is held open, over the top dwell point, and 5 degrees beyond, to H1, thus infringing upon the following suction stroke, so that the succeeding cycle is belated to enable the spent products of combustion to depart, it being better to lose time than to accept a state of scavenging which would assure that some of the spent products would contaminate the new charge.

In a motor having more than one cylinder it will be understood that the timing relations will be the same in all, but the firing order is fixed with equal increments

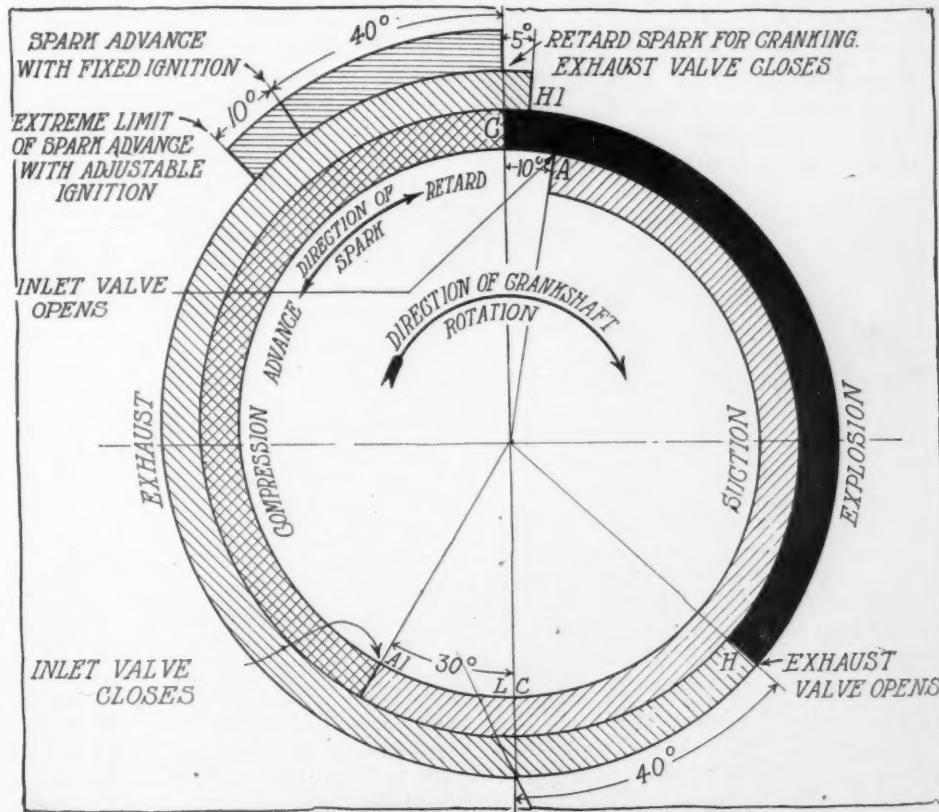


FIG. 1—DIAGRAM EXPLAINING TIMING OF GASOLINE MOTOR

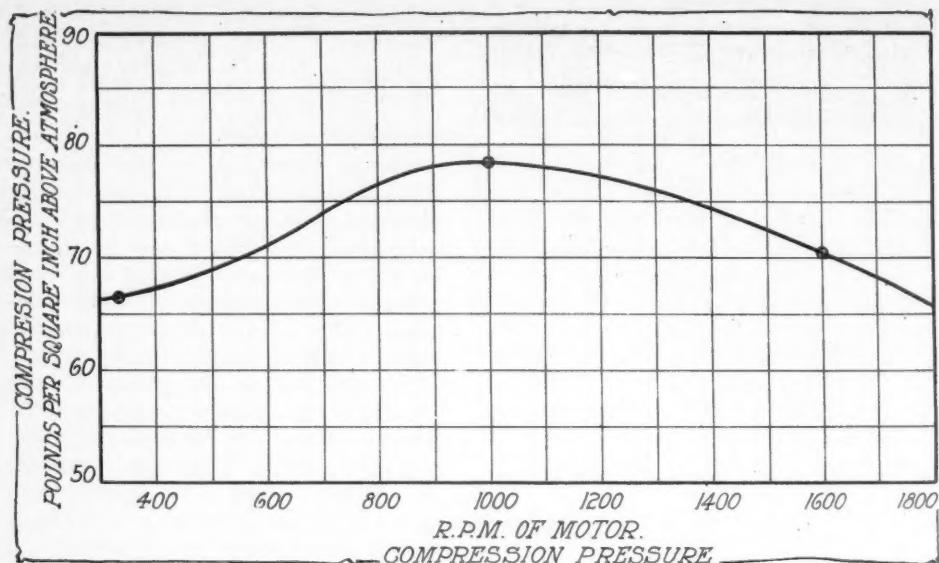


FIG. 2—SHOWING HOW COMPRESSION CHANGES WITH SPARK LEAD

of time elapsing, which is all that has to be taken into account.

Cranking the Motor

Fig. 1 illustrates cranking a motor. If it is to be a safe operation the spark must be retarded, but the less the angle of retard the more chance there is of starting the motor without undue effort. This statement of fact will appear to be rational if account is taken of the increasing power which follows advancing the spark when the motor is running. The illustration shows a 5-degree retard for cranking; this is adequate to assure safety against a back kick, but if the crank is rotated on the up or compression stroke smartly the best results will follow if the spark is actually advanced 5 or 10 degrees. This practice is only recommended if the motorist is capable of inducing a smart rate of angular motion to the crank, and by so doing store in the flywheel enough energy to offset the resistance offered by the ignited charge, provided ignition takes place before the dead center, as it will if the spark is advanced during the cranking operation.

The figure indicates for fixed ignition that it should take place at 35 degrees early—advancing the spark 35 degrees. This advance is a mere approximation and in a general way the following will hold: In a long-stroke motor reduce the angle of spark advance; in a short-stroke motor increase the angle of spark advance; the actual range of variation lies between 20 and 38 degrees considering twenty well-known makes of motors; if the spark can be controlled it follows that the running conditions—depending upon speed and state of the mixture—will lie between 20 and 45 degrees advance of the spark.

The question is frequently asked, Why is it not possible to advance the spark by automatic means? The first answer is that no governor can be devised to afford proportional travel over a wide range of

speed; in other words, we do not know how to make a governor which will serve the purpose. Even were governors available the problem would not be solved, since the compression in a motor cylinder is not constant for all speeds. Fig. 2 shows what may be expected in motors in general by way of variations of compression, although the compression does not change for speed in all designs of

Munsey Tour Results

(Continued from page 3.)

against its record. No. 20 Winton lost 5.5 points, of which 1.1 were sustained on the road and 4.4 in the technical examination. The Marmon lost .6 point in the technical examination and .1 point for work on the road. No. 13 Pullman was penalized 10.7 points, of which 9.9 were on the final examination.

The American Simplex, winner of division 5, lost but .9 point. On the second day the driver stalled the motor, which cost .1 point. In the technical examination a penalty of .1 point was given for an inoperative bonnet fastener, .1 for loose cleat on front spring, .1 for loose exhaust pressure pipe, .3 for loose cleats and .2 for lost motion in the steering wheel.

Fine Showing by Renault

The Renault came through with but .4 point marked against it, winning division 6. The penalties consisted of .1 point for adjusting hub cap, .1 for loose spring cleats, .1 for loose leather boot on universal, and .1 for loose transmission oil stud.

The Maryland and Columbia finished as non-contestants. Both received severe injuries that put them out of the running. The Matheson was disqualified in New York when the driver put the car in the Matheson garage unattended by an observer. The two Croxton-Keetons were withdrawn, No. 17 at Willimantic and No. 16 in New York. No. 37 Pullman was withdrawn in Albany and the Selden in Philadelphia.

motors alike. In this particular case the compression was 67.5 pounds per square inch at 335 revolutions per minute, and 76.5 pounds per square inch at 1,000 revolutions per minute, but it fell to 70.5 pounds per square inch at a speed of 1,600 revolutions per minute. The changes in compression were not at all great in this motor, considering the changes which actually do transpire in motors in general. Since the inflammation of the charge is fast or slow depending upon compression it is plain to be seen that no governor will be capable of following the curve of changing compression, and no automatic means will be of any great value under the circumstances.

Fig. 1 shows the timing of valves which delivers the maximum results in a certain motor. It seems to be true of valve timing that considerable variation is allowable, and in general the range in practice is as follows: Lead of exhaust opening, ranges between 30 and 62 degrees; lag of inlet closing, ranges between 0 and 40 degrees; lag of exhaust closing, ranges between 0 and 28 degrees; lag of inlet opening, ranges between 0 and 34 degrees. This wide range, in the timing of valves, is bound to confuse the average motorist, and the question naturally comes up as to the best selection of timing of valves. This question cannot be answered, since even the makers must use a manograph to ascertain the right conditions. In a general way the tendencies are as follows: Lag of exhaust closing to be reduced as the stroke of the motor is increased in length, or if the crankshaft speed is relatively low. Lag of inlet opening will reduce as the stroke is lengthened and as the speed of the crankshaft is reduced. Lag of exhaust closing to be increased as the speed of the motor is high, or if the stroke is shortened. Lag of inlet opening to be increased as the speed of the motor is increased, or as the stroke is shortened.

Can the inlet and the exhaust valves be open at the same time, that is to say, can the lag of the inlet valve opening be greater than the lag of the exhaust valve closing? Yes. The practice is quite common, and if the stroke of the motor is short, indicating that the speed will be relatively high, the inlet lag angle may be greater than the exhaust lag angle, so that the inlet valve will open before the exhaust valve closes. There is nothing very strange about this; every two-cycle motor has inlet and exhaust ports open at the same time. In four-cycle motors it is common practice to close the exhaust just when the inlet valve is opening, but in high-speed motor practice gas inertia may be taken advantage of to some extent, and this means that the inlet valve may be opened before the exhaust valve is closed. Indicator cards will tell of the advantages to be realized by this practice, and they probably are not very great, but the motor will run under these conditions and experience will be the master thereafter.



Motor Car Shop Kinks



THE accompanying illustration, Fig. 1, shows how two searchlights of the largest size, 10 inches, were attached to a car for temporary use. No new holes had to be drilled in the frame of the car. Instead of using headlights, swivel searchlights with flat dashboard brackets were employed. The regular headlight brackets were removed, and a bolt was put through the rearmost leg A of the searchlight bracket and one of the two holes used with the regular headlight brackets. The other support of the searchlight bracket was afforded by an iron strap S bolted to the front upper arm of the searchlight bracket and to the front end of the frame, as the illustration shows, the spring eyebolt being used. To steady the lamps, which were large and heavy, a flat cross strap had its ends turned up and drilled for the inner trunnion bolts of the searchlights to pass through. To keep the searchlights pointing straight ahead and prevent them from tilting up or down on their trunnion bolts, light iron straps C were bent and drilled to hold the rubber handles projecting from the backs of the searchlights. The lower ends of these straps were bolted to the rear arms of the swivel brackets, and their upper ends had adjustable clamping strips which were tightened on the searchlight handles. The car to which these searchlights were fitted had also a 10-inch dashboard searchlight, and a pair of 7-inch side lights, replacing the oil lamps.

WHY THE ENGINE BALKEDE

Causes of engine debility which are easily diagnosed when they occur singly may be very confusing when two or three occur at once. For example, a certain motorist using the Atwater Kent ignition system with six dry cells borrowed a Sireno and a Klaxon for experimental purposes. With them he borrowed a 6-volt storage battery, which he installed in place of the dry battery. He took a 60-mile run, experimented with both noise-makers to his heart's content, and then restored the dry battery to its original place. The next morning was cool. Going to the garage to make an early start, he cranked the motor without result. Laying it to the carburetor being chilled, he flooded the latter freely; occasionally a faint impulse resulted from snapping the switch, but no others followed it. A kettle of water was heated and poured over the carburetor, with no better result. Then the contact maker was examined, and it was found the platinum contact points had been eaten away somewhat by the heavy storage battery current, no adjustment having been made in the contact when installing the storage battery. The contact

Aids for the Amateur

screw was set closer, and the engine started without much difficulty. It was noticed, however, that the current was weaker than it should have been, and it was concluded that the dry batteries, which had been used somewhat to run the signal, were nearly exhausted.

The following evening the car was run for a mile on an errand and stopped. It could not be restarted. Setting the contact screw as close as possible made no difference. At length the tank was explored; it was bone dry! The owner, of course, thought that he had got to the bottom of his difficulty when, on putting a couple of quarts of gasoline into the tank, the engine started at once; but 2 days later he found that he was still mistaken. Intending to take a run of some distance, he opened the battery box to test the cells and discovered that in the haste of re-connecting them he had connected one cell in opposition to the other five, so that virtually he was running on four cells instead of six. On connecting the sixth cell aright the battery was found to be in first-class shape, and the contact screw was slackened back a third of a turn without impairing the spark.

The same owner some time previously found himself stranded in a village by unexpected failure of the battery, little warning having been given save a slight missing for the past 5 miles. He should have been able to correct the missing and go some distance further by adjusting the contact screw closer. Unfortunately, when putting in that battery, he had neglected

to slacken back the contact screw from the close setting he had given to it to use up the last energy in the previous battery, and the close adjustment had sapped the strength of the fresh battery with undue rapidity. On putting in new cells in the village aforesaid he took the precaution to slacken back the contact screw to a point where it gave full power without needless consumption.

SAVING GENERATOR TROUBLE

A high-grade automatic gas generator can be turned on and off as desired until the carbide is all consumed. This makes it unnecessary to open and recharge the generator every time one is out after dark. The only qualification is that the tank is likely to need refilling, owing to part of the water having been forced out by after-generation, if the generator is of the type having gas valves which are shut off to stop generation. With generators of this type it is handy to carry around a small quantity of water, just as a spare can of oil is carried. An empty salad oil can holding 1 or 2 quarts is convenient for this purpose.

GEAR NOISES

There are two causes for that whirring noise characteristic of the gears of a motor car. Insufficient lubrication is one cause, and the other is that the gears are not meshing properly. Engine and transmission gears will make a whirring sound if they are out of round or subject to misalignment due to the gears or shafts being sprung; and lack of adjustment of the bevel gears will render the rear axle noisy and cause rapid and unnecessary wear.

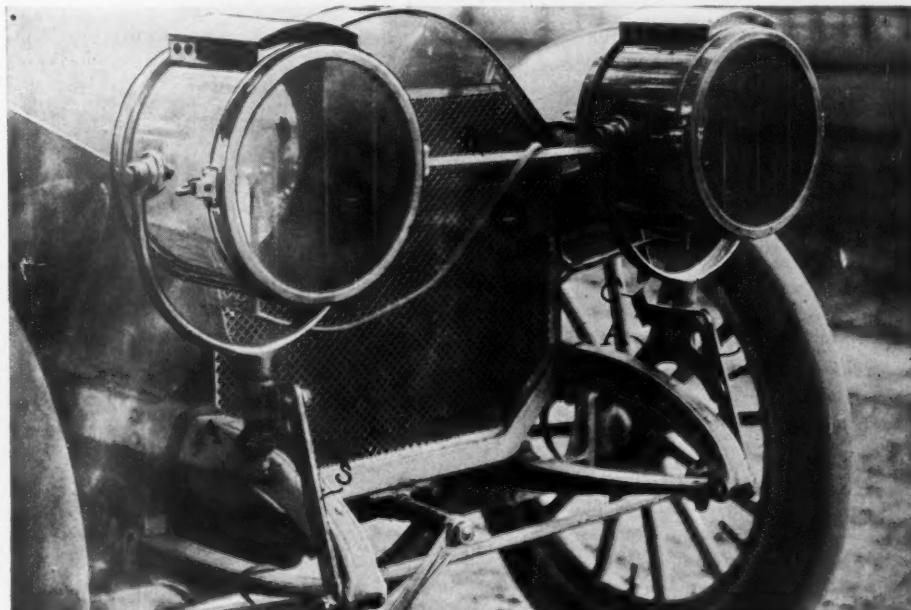


FIG. 1—ILLUSTRATING ATTACHING OF LARGE HEADLIGHTS

SOME LUBRICANTS USED FOR MOTOR CARS

TIME was, not so many years ago, when the problem of lubrication played but a secondary part in the design, manufacture and operation of a motor car. It is somewhat different now, and both manufacturer and owner have come to a realization that the proverbial ounce of prevention is worth even more than the pound of cure in the case of supplying good and sufficient oil and grease to the moving parts of the modern motor car. Experience has so impressed on the minds of the motoring public the necessity for the thorough lubrication of all moving parts on the car that this is one of the first points considered and investigated by the intending purchaser who knows his business.

A striking example of the increased attention which is being bestowed on this feature of motor car design will be found in the number of cars equipped in recent years with small grease cups located at the end of every body spring where the bolt passes through the eye which joins the halves together or which fastens the lower half to the frame. This same idea has been carried out to every part where there is only occasional friction, and the high-class motor car of today is provided with twice the number of oil holes, grease cups and pipes as was the case 5 or 6 years ago.

Many Makes of Lubricants

It is but natural that this increased use of lubricants, with the attendant close investigations and tests of the proper kinds, grades and weights of oils and greases best suited for each particular purpose, should call forth the best efforts on the part of the manufacturers of these products, and today there are a score or more of well known firms engaged in the production of as many different makes of friction annihilators. Some of these firms have been engaged in the manufacture of lubricants for years and, foreseeing the demand created by the motor car, have added the special oils and greases to their regular lines of products; others, having entered the field more recently, have devoted their whole time and attention to the production of the motor car lubricants; but in whichever class a certain oil may fall, the competition in this field is so great that a product which remains on the market for any appreciable length of time must certainly have some merits to recommend it.

The peculiar requirements of gasoline motor car lubrication demand that the oils possess certain qualities which render them entirely different from those used for any other purpose. For example, the best grade of cylinder oil available for a steam engine would be entirely unsuited to the uses of the gasoline motor. This does not mean that the

By H. W. Slauson
PART I

gasoline motor will not run when lubricated with steam engine oil, or that the difference will necessarily be apparent during the first day's operation, but eventually the decreased efficiency of the machine and the conditions disclosed on examination of the cylinder and piston rings will demonstrate forcibly the above fact. Such a difference will not be found to exist in the case of the proper lubricant for the wheels, transmission, differential, etc., of the motor car, but the exacting requirements necessary to the highest efficiency of the whole machine demand the use of special oils and greases which were not found on the market before the car made its appearance.

General Theory of Lubrication

Although the general theory of lubrication is probably pretty well understood by the average car owner or driver, there are several considerations that enter into a detailed discussion of the subject which it is necessary to keep in mind in order to follow some of the fine points and distinctions made by the manufacturers in substantiating claims for their products.

While the primary object of the use of a lubricant is to decrease the heat generated between the two moving surfaces by diminishing the friction formed, it may be stated more concisely by saying, "A lubricant reduces the coefficient of friction of one surface moving upon another." To accomplish this object the lubricant performs two functions: One of these is the formation of a film or coating at the contact points of the moving parts, thus entirely separating one from the other. A large part of the heat formed by the remaining friction is carried off by the worn oil, the place of which is supplanted by a fresh supply at regular intervals. Since the coefficient of friction between two moving surfaces is much higher than that between one of those surfaces and a film of oil, it follows that the heat of friction is very greatly reduced by the interposition of this film of the lubricant. This reduction of the coefficient of friction is practically the second function of the lubricant, and in order properly to perform this office it must be unctuous, or in other words, slippery or greasy.

Reducing Friction of Moving Parts

It will be readily seen that in order to reduce the friction of moving parts the oil must be of sufficient consistency to withstand the pressure applied between the two surfaces, so that the film will not be broken down or forced out. If this should happen, the moving parts will come in actual contact with each other and produce the same effect as though

no oil whatever were introduced between the surfaces. This consistency or thickness of the oil is known as viscosity, and is measured by comparing the length of time required for a given amount of the oil to flow through a certain opening with that occupied by the same amount of water dripping through an aperture of like size. Its viscosity is expressed in terms inversely proportional to the time required for the water, so that the higher the viscosity of the oil the slower will be its flow and the greater its consistency. In reality, the thickness or consistency is more properly the specific gravity of the oil, but this so closely follows the viscosity that the terms will be used to mean the same in this article. It is evident, then, that the greater the pressure existing between the two moving surfaces the thicker or more viscous must be the oil required. On the other hand, a lubricant of too great a consistency has a higher coefficient of friction when applied between the moving parts, and is to be avoided on account of the increased power required to overcome this friction.

Likened to Ball Bearings

The manufacturer of one of the best known brands of motor car oil likens the friction-reducing properties of lubricants to the ball bearings in use on many cars. The minute molecules or globules of which the oil is composed correspond to the balls. If these tiny balls of oil are too small to withstand the strain between the two moving surfaces without being crushed, the lubricant is too light, or not sufficiently viscous, and a thicker oil must be used, for the same reason that larger balls are required in a bearing in which the pressure is too great for those of a smaller size. On the other hand, the larger and heavier globules of an exceedingly viscous lubricant will impede the movement of the two surfaces much more than would be the case with the smaller molecules of an oil of less viscosity. It is evident, then, that the lightest oil which can be kept in place between the moving surfaces will give the maximum lubricating effect, for the same reason that the smallest and hardest balls consistent with the required strength are those best suited for use in a ball bearing.

Other Essential Properties

Other essential properties of a good lubricating oil are a high flash point, low chill point, freedom from adulterants and acids, and absence of any tendency to become sticky or gummy. When burned, there should be but a small amount of residuum remaining in the form of a dry carbon. The flash point of the oil is the temperature at which it gives off an inflammable gas, and is a few degrees lower than the actual burning point of the oil as a whole. The chill point is the

temperature at which the oil loses its fluidity to such an extent that it is rendered unsuitable for lubricating purposes.

Just which of the lubricants for motor cars combines these properties in such a manner as to form the most nearly perfect oil, however, is difficult to determine, and although each maker will naturally claim his product to be the best, it is only by the continued use of the different brands under all conditions and by a subsequent examination of the lubricated parts that the oil best suited to certain requirements can be discovered.

Oil Makers Court Inquiry

As a rule it has been found that the leading manufacturers of motor car lubricants do not desire ignorance regarding the subject on the part of the customer, but rather do they court inquiry of all kinds. Nevertheless, a large part of the public is sadly misinformed in regard to lubrication, and although much of this ignorance may have been disseminated by unscrupulous agents, the manufacturers themselves deey many of the fallacies which exist in the minds of some motor car owners. Probably the absurdity most easily swallowed by some of the gullible public is the statement made by many salesmen that "this oil contains no carbon whatsoever." This is a fallacy on its face, but it often appeals to the unthinking purchaser because he realizes that it is the carbon deposit which renders necessary the cleaning of cylinders, pistons and valves—consequently an oil containing no carbon will leave no residuum. The absolute absurdity of such a statement, however, will be realized when it is remembered that all oils and greases are hydrocarbons, or chemical combinations of hydrogen and carbon, and to state that the latter element is lacking entirely is to say that the oil is composed of hydrogen alone, which is a highly inflammable gas, or to admit that some adulterant or impurity is used in its place. The only difference between any pure oil, grease, gasoline, kerosene, alcohol, and the like is in the proportion in which the hydrogen and carbon molecules are chemically combined. In other words, all hydrocarbons are expressed by the chemical formula $H_x C_y$, in which the values of x and y are different for each substance. Carbon, chemically combined, is as necessary in the formation of a lubricant as is oxygen in the composition of water.

There Can Be Too Much Carbon

It is true that there can be too much carbon in an oil and that an excess of this will produce the objectionable deposit in the gas engine cylinder, but this is of the uncombined or free kind, and should not be confused with the carbon content as it appears in the molecular formula. The difference between the two forms of carbon as it appears in the original oil can be better understood when it is stated that free carbon can be filtered out by

mechanical means without affecting the composition or chemical formula of the resulting lubricant.

This process of filtration of the oil after distillation is one of the features put forward by the Havoline Oil Co. By means of continued filtering, the darkest oil may be changed in color to an almost water-white appearance without affecting its viscosity or specific gravity in any way. The substance through which the oil is filtered and which serves to remove nearly all of the free carbon is powdered bone. After the bone has been used for some time, the carbon which has collected with it may be burned off and the substance used again for successive filterings of the same or the new oil. It is claimed that this oil, when thoroughly filtered, may be burned on a piece of perfectly white asbestos and will leave scarcely any residuum on the surface.

Valuable By-Products Obtained

Although Havoline oil is brought to its final pure white state by successive filtrations in the manner above described, the carbon is removed from the original product as much as possible by a special process or run of distillation from the crude oil from which all mineral lubricants are obtained. In making this special run from the still, many valuable by-products are obtained which, if wasted, would increase the cost of production of the oil by this method to a practically prohibitive figure.

Another fallacy which is often entertained in the minds of even the most expert gas engine designers is the belief in the necessity for a high flash point for all internal combustion motor cylinder oils. Many seem to be of the opinion that if the oil will not burn, no carbon residue can remain, no matter how much of this element there may be in the lubricant in a free state. The absurdity of this will be realized when it is stated that the highest flash point it is possible to obtain in a good oil is about 600 degrees Fahrenheit and that the heat of the combustion in the cylinder head ranges anywhere from 1,200 degrees to 4,000 degrees Fahrenheit. In other words, the manufacture of an oil which will not burn when subjected to the heat of a gas engine cylinder is an impossibility. It is only necessary, then, for the flash point of the oil to be above the temperature reached by the piston and the interior of the cylinder near the bottom of the stroke, for it is at these places that the lubrication takes place. Any oil escaping past the piston into the combustion chamber near the top of the stroke will be burned eventually, no matter how high its flash point may be. All things considered, it is probably fortunate that whatever excess oil escapes past the piston into the cylinder head will be burned, for it is then disposed of automatically and prevents the flooding of the cylinder with the lubricant, which would eventually reach

the exhaust and intake ports and the carburetor.

The Columbia Lubricants Co., manufacturer of the Monogram oils and greases, emphasizes the fact that none of its gas engine oils are blends, but that they are all straight runs. This distinction may be explained by a short statement of the process of manufacture of lubricating oils. As stated in one of the preceding paragraphs, all cylinder oils are distilled from crude oil, or petroleum. The product of the first run, or, more simply, the condensation of the first and lightest vapors given off, is benzine or more volatile hydrocarbons. Then follow different gravities of gasoline, light oils, medium weight—specific gravity—oils, heavy oils, and finally cylinder stock—all in the order named. It will be seen that the more volatile the product the earlier is the run at which it is produced. Crude oil as it is taken from the ground gives forth a very strong odor of gasoline.

Some of these runs are easier to obtain than others, and it may be that certain obstacles will arise in a particular process which make it exceedingly difficult to obtain an oil of a certain specific gravity, although the lighter and heavier oils on either side of it may be produced with no trouble at all. Then, too, there may be a considerable waste of by-products before the desired run is obtained. The desired viscosity or specific gravity may be obtained by mixing or blending a light and a heavy oil in the proper proportion. While this process produces an oil of the required specific gravity and color, it is claimed by the Columbia Lubricants Co. that such a blend is not as efficient as the same viscosity of oil obtained by a straight run, for the same reason that a chain is only as strong as its weakest link.

Would Be First to Disappear

On this assumption, the oil of the blend having the lower burning point would be the first to disappear when subjected to a sufficiently high temperature, and would leave the other oil as the only lubricant. In like manner, the molecules of the oil possessing the lower viscosity would be the first to be broken down under too great a pressure between the moving parts. Of course it is only under these extreme conditions that any difference between the blends and straight run oils can be noticed, but the manufacturer in question says that he desires to take no chances and consequently produces his lubricant by the later method.

An officer of the above company is authority for the statement that the yellow or brown color remaining in the oils after distillation is due to about 1 percent of carbon, and that about one-half of this amount can be filtered out, giving a nearly water-white color to the resulting lubricant. "But," said this man, "although we filter our oil, we do not pay so much attention to the removal of every bit of this carbon as we do to the nature

of the residuum remaining after the oil has been burned. If this residuum takes the form of a sticky substance adhering to the piston and interior of the cylinder, dust will be collected, the soot resulting from the combustion of an imperfect mixture will be added, and the mass will finally harden and form the carbon coating in the motor which is prolific of so much trouble and which generally needs to be removed every few months. We strive to produce an oil which, while comparatively free from carbon in its uncombined state, will burn and leave its residuum in the form of a fine, dry powder which will not collect on the interior parts of the motor but which will blow out with the exhaust gases, leaving the cylinder as clean as before."

Formerly Heavy Oil Necessary

In the early days of motor car manufacture, when the fine machine work was not bestowed upon the interior of a motor cylinder, it was necessary to use a very heavy oil in order to fill the pores of the cylinder walls and act in conjunction with the rings to keep the compressed charge and exploded gases from leaking past. Now that the interior of the cylinder walls, however, receives as much attention as possible at the boring mill and grinder, a much lighter oil may be used as a lubricant. Care should be taken, however, not to go too far in this direction and use an oil which is so light that it will wear down easily, for then most of its lubricating qualities will be lost. It is the happy medium in this field, as well as in the majority of others connected with motor car operation, that gives the best results under all conditions.

In the distillation of crude petroleum for the manufacture of lubricating oils, there is a certain point beyond which the process cannot be carried advantageously without a great loss of valuable products. If distillation is carried to the limit, however, regardless of this waste, a heavy, black residuum will be found in the still which will prove to be pure carbon. This carbon appears in the form of coke, and furnishes additional evidence of the similarity of the origin of coal and petroleum.

Oil in the Residuum

After distillation has been carried as far as is consistent with a minimum loss of the valuable by-products, it will be found that the residuum still contains many heavy oils and greases. These may be removed by further distillation in an apparatus known as the cracking still, and many lubricants can be obtained in

this way. When so produced such lubricants are known as paraffin oils. It is claimed by many of the manufacturers, however, that the oils obtained by this method are necessarily adulterated and inferior in lubricating qualities to those produced by distillation in the first apparatus. They also contain a higher percentage of free carbon, which must be removed before the oil is available for commercial use, and such a product is not considered, as a rule, as being well suited for use in a gas engine cylinder or in any

of the delicate parts of the motor car. It may be, however, that by means of special processes and by taking the utmost care and precautions, a lubricant obtained in this way can be rendered as pure and satisfactory as the first distilled oils, but it seems to be the consensus of opinion of most of the manufacturers that the latter are the better.

One of Panhard Features

This is one of the features claimed for Panhard oils, and no paraffin lubricants will be found among the products of this concern. It is stated that such care is taken in the distillation of these oils that there is scarcely any carbon deposit remaining after even the darkest-colored oil has been burned on a piece of white asbestos. This is supposed to substantiate the claim made by some makers that the color of an oil is not due entirely to free carbon, and that even the darkest lubricant may have as little of this element in the uncombined state as will a water-white oil.

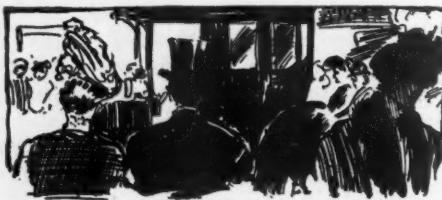
About 150 various grades and kinds of oils and greases for every conceivable purpose are made and sold by the Standard Oil Co. Among the best known of its lubricants for motor car uses are Vacuum Mobiloil and the Mobillubricant, Arctic Grease and Zeroline. The Vacuum Mobiloil is made in different thicknesses for gas engine lubrication, and the Mobillubricant is a grease intended for grease cups, transmission and differential cases, and, in fact, any place where the use of a grease is preferable to that of an oil.

Good In Low Temperatures

Zeroline obtains its name from its exceedingly low chill point, which enables it to be used in low temperatures in which ordinary oils would become chilled and hardened to the point where they would lose their fluidity. It is claimed that this oil can be poured easily when it has been cooled to a temperature of 0 degree Fahrenheit, and that, on the other hand, its flash point is as high as the average. This long range of temperature through which the oil may be used makes it particularly adapted for service in the cylinders and crankcase of the motor in cold weather.

This brings to mind another fallacy popular among many motorists. Whenever a certain motor is troubled with crankcase explosions, the owner, garage man or rival oil dealer seems prone to lay the responsibility for the difficulty on the grade of oil used for the crankshaft and cylinder lubrication.

(To be continued next week.)



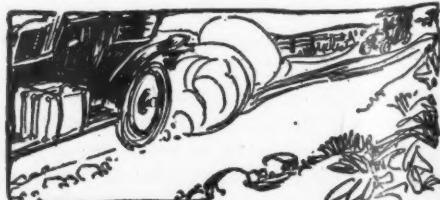
Manufacturers' Communications

WHY CROXTON WITHDREW

Massillon, O.—Editor Motor Age—The Croxton-Keeton entries in the Munsey reliability tour went through as far as New York city on the return with the following scores: The 45-horsepower German type arrived at New York with a perfect score, and the 30-horsepower French type was penalized 4½ points for breaking an unessential bolt. Mr. Bernhart, our vice president, was threatened with a very serious illness on account of the wet weather encountered and at the arrival of H. A. Croxton, the president of our company, conditions were such in our New York branch that they demanded the immediate use of these entries for demonstration purposes. Having covered all but the last 2 days of the reliability run, we had proved all that we wished to prove in respect to endurance and speed under unfavorable weather conditions and rough roads, and as they were the only cars available for demonstration in our New York branch, Mr. Croxton gave orders for an immediate withdrawal from the tour, and placed the cars at the disposal of J. P. Stoltz of the Croxton-Keeton Motor Co., of New York city.—S. W. Croxton, Jr., Croxton-Keeton Motor Co.

QUICK TIRE CHANGING

New York—Editor Motor Age—The last 24-hour race on Brighton beach, August 27 and 28, was interesting on account of the demountable rim situation. Some quick changes were made. The two six-cylinder Acme cars were fitted with Doolittle rims. Single tire changes were made by one man in from 18 to 35 seconds, which included the jacking up and letting down of the car. At one time four tires were changed, the car was filled with gasoline and oil, the entire time being 1 minute and 22 seconds from the time it came on the stand until it was away again. In another case the Acme No. 4 was 1 minute and 7 seconds changing all four cases. The Acme No. 3 another time was 1 minute and 10 seconds changing four casings, three men making the entire change. These figures were taken by myself with a stop watch.—H. H. Knepper.



CARE NECESSARY IN CLEANING MOTOR CARS

In the spring of 1909 two high-priced touring cars of the same make were received by two wealthy neighbors. A in laying out his plans for the summer decided on an extensive tour of the country, and after making all necessary preparation departed and was seen no more for several months. B was prone to content himself with short country rambles around the metropolis in which he lived, and about his country home some 60 miles distant, none of which was of more than 2 or 3 days' duration.

As the melancholy days drew nigh, both cars were again to be seen standing in front of the homes of their respective owners, but what a difference in the appearance of the two cars! Each was scrupulously clean and all brass parts equally lustrous, but where was the luster of the body varnish, and what had caused the deep blue color to fade so in spots? It was a dull spectacle, this A's car, in contrast with the car of B, which still retained almost as brilliant an appearance as when the two cars were received in the spring. Surely there must be cause for this failure on the part of A's car to withstand the effects of the elements; had not B's car come through rains and mud, and sun and dust, and was none the worse for all of that? Indeed it had—but herein lay the difference. A toured afar, the car was oft rained upon in the morning and dried by the wind and sun of the afternoon; many overnight stops were made at villages where there were no facilities for washing a car, and mud and oil would accumulate on the running gear and remain for days at a time, making warm water and strong soap necessary for its removal; the chauffeur who knew how a car should be cleaned generally was exhausted after a long day's drive and when at night stop was made where washing and polishing were possible, the job generally fell into the hands of men who either did not know the ill-effects of warm water and strong soaps or cared not how the job was done as long as it looked all right.

Car Carefully Looked After

This, however, was not the case with B's car. After every rain, or in fact after every trip, the car was washed carefully with cold water from a hose, then sponged with a soft sponge and plenty of slow-running water, after which a chamois was used to thoroughly dry all polished surfaces. No soap whatever was used, except where oil or grease was encountered, and a cleaning generally was followed with an application of a good body polish.

Few owners, whether they look after their vehicles personally or not, know how to keep the paint on the body of a car in proper condition, with the very natural result that it is frequently, and often unnecessarily, the case that a car which has been in use only a few months acquires a

Way to Do It and Way Not To

dull, lusterless appearance, robbed entirely of the brilliancy which is so conspicuous and attractive on a new vehicle. This unsatisfactory condition does not arise from hard usage in a majority of instances, but comes about simply from a lack of knowledge on the part of those responsible for the car's care, or the proper treatment it should receive.

Be Careful of Varnish

A really fine piece of carriage painting cannot be accomplished under several weeks, since to do it requires from twelve to sixteen coats of fillers, colors, surfacers and varnishes to be put on and rubbed down by hand and the most painstaking care exercised, especially in applying the last coats of varnish, when perfect atmospheric conditions and a certain temperature are absolutely essential in order that the best results may be attained. Although it is hardly to be expected that a moderate-priced car will be finished in this expensive manner, still even the painting upon it is done with considerable care and is a delicate piece of work, easily losing its beauty if not correctly treated, but retaining its brightness for a long time if it is taken care of as it should be.

One of the most important points to be observed in cleaning a car is that no water should be allowed to remain on the varnish for any length of time. Wherever water has rested too long upon the varnish it will be found dull and cloudy, and a spattering of water, if not removed, will leave behind it a spotted appearance. Of course the same is true of oil, only to a greater extent, and it therefore can not be removed too quickly.

When the car is washed, use cold water. A hose is very convenient for this work, but avoid using too much force in the stream. A stronger stream may be used for the rougher part of the cleaning, as in removing the mud from the running gear and from under the fenders, but the carriage washer must not hold the nozzle close to any of the bearing cases, otherwise water will be forced into the bearings, displacing the oil and causing rust. After this wash off all loose dust and dirt from the varnished surfaces with a slow stream of cold water. Avoid the use of warm water for it will in a very short time take all the life out of the varnish, leaving a dull, dead surface. If still water is used, keep the water clean and the sponge constantly rinsed out, so that you will not be rubbing particles of grit over the smooth surface of the body's finish.

Top Needs Attention

After having been out in a car in the rain, it is very poor practice to lower the top before it has become thoroughly dry, for moisture retained in this way with a

pantesote or mackintosh top will decay the fabric and cause a decomposition of the waterproofing material used in the construction of these materials, leaving unsightly water marks and stains on the inside of the top. The outside of a pantesote top is best cleaned with lukewarm water and castile soap, and a preparation known as Miller's dye is often employed to obliterate the stains on the inside. This dye is applied with a sponge, and not only over the parts affected but over the entire inside of the cover, in order to maintain one shade of color. Mackintosh or mohair tops, head linings and slip linings or seat coverings are easily cleaned with Jewell soap and water, then rinsed with clear water and allowed to dry. After this it is dry-cleaned with a stiff brush. Jewell soap comes in kegs, and may be obtained from almost any dealer in cleaner's supplies. It is cut up into chips and dissolved in water by boiling; cold water is then added and it is left to stand over night, when it will be found to have formed into a gelatin. It is now ready to be beaten into a foam and applied with a sponge and a little elbow grease, as it is known in the vernacular of the trade. A tablespoonful of chloroform or ether added to the soap preparation will aid in removing dirt.

Cleaning Upholstery

For cleaning cloth upholstery one expert claims that he knows of nothing better for removing the dust than stale rye bread, the process of cleaning being to remove the dust with slices of stale rye bread, then follow with a thorough washing with Jewell soap. The most commendable feature of this soap is its ability to cleanse without attacking the color of the materials on which it is used. This also applies to carpet floor mats. To clean leather upholstery it should first be sponged off with a solution of one part of pure ammonia to nine parts of water, then rinsed with pure water. This is to remove all dirt and grease. After it is thoroughly dry it should be wiped—or buffed up as they say—with a piece of soft woolen cloth. A good leather dressing properly applied at this time will also add to the appearance of the job.

Glass is best cleaned with pure water; the woodwork of a glass front or any other highly-polished surface may be cleaned with clear cold water, and after having been thoroughly dried with a chamois, followed with an application of some good body polish, then wiped with a soft cheese cloth.

All brass or nickeled parts may be brightened up with any good brass polish, the general practice being to remove all readily removable parts from the car, in order that they may be more easily handled. It is also well to apply the polish to all parts at once, then polish with a cloth or buffing-wheel.

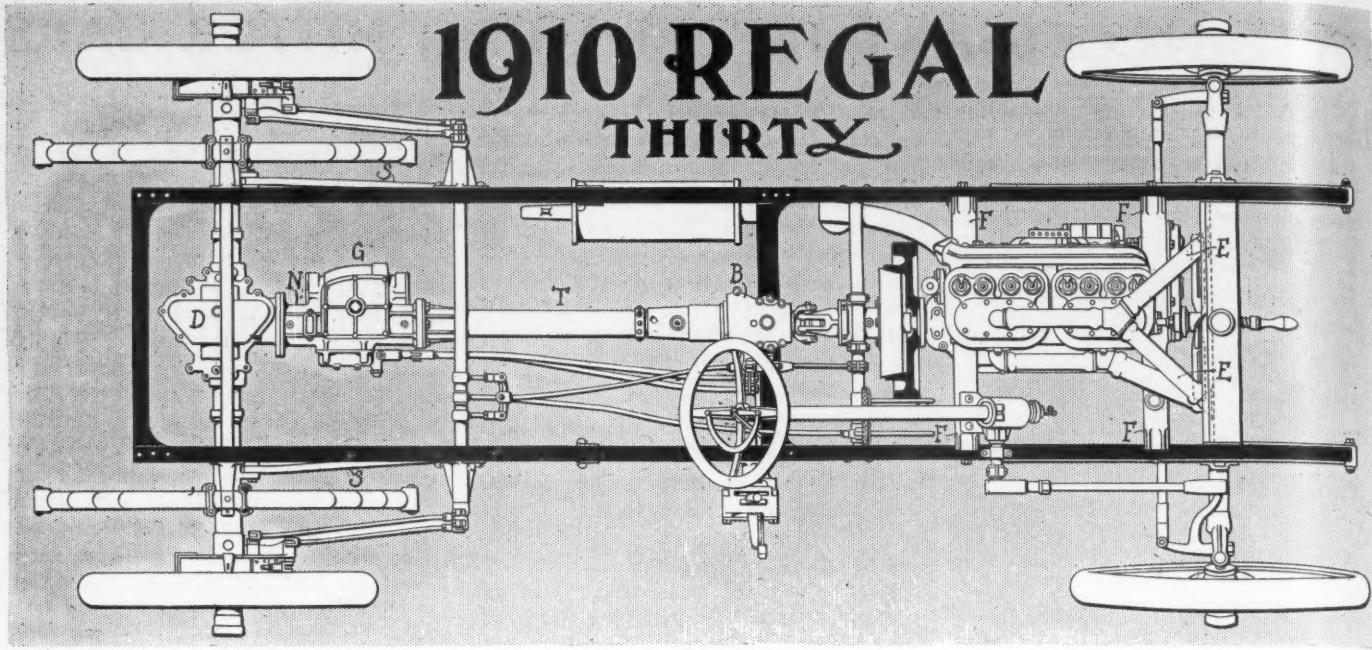


FIG. 1—GENERAL VIEW OF CHASSIS OF REGAL THIRTY FOR 1910

THE Regal car for 1910, in general design, is identical with that of the present season although its maker, the Regal Motor Car Co., Detroit, Mich., has added upwards of half a score of minor improvements to the various systems in the car, all of which are refinements as a result of a year's experience and most of which are in harmony with tendencies evidenced by the leading car builders of the country. Before enumerating not a few of the changes, it may be well for those not familiar with the present Regal, to draw attention to Fig. 1, a plain view of the chassis which shows the leading characteristic of this car, which is the gearbox G formed as a unit with the rear axle system, and taking its support through a narrow continuation neck N which bolts to the differential housing D and is supported through a torsion tube T which at its forward end has a ball-and-socket support at the point B from a socket carried on the cross member of the frame. The Regal motor is of the conventional four-cylinder, four-cycle type characterized by thermo-syphon cooling circulation and has a double return pipe from the waterjacket to the radiator. The two arms, or return pipes, are marked E, and in Fig. 2 appears the point at which these enter the radiator. The motor support, Fig. 1, is a four-point type with integral crankcase feet F resting direct on the side members of the frame, which are not offset at the dash. The frame is a simple construction without subframe members of any nature, and is supported at the rear by a set of elliptic springs which are used in conjunction with radius rods S from the axle ends to the frame members, and through which the drive from the rear axle is transmitted to the frame. This illustration, also, shows the double set of rear wheel brakes of the expanding and contracting type.

The question of power in the Regal motor has remained unchanged, the 4 by 4-inch cylinders with a rating of 25.6 horsepower being continued. These are of the L type and are cast in pairs with integral waterjackets. The crankcase is a two-part construction, the lower portion larger than usual, serves as an oil reservoir in the lubricating system. This system has been improved by the placing of an oil gauge G, Fig. 4, on the left side of the crankcase. This gauge contains an indicating disk carried on a vertical rod which at its lower end is supported on a cork float in an oil-well, the cork responding to the different oil levels the same as does the float in a carburetor, and the indicating disk registering the level on the glass gauge. In the Regal oiling system the oil is elevated by the pump from the reservoir R formed under one-half of the crankcase, the pump delivering the oil to the three crankshaft bearings, whence it overflows, furnishes the splash into which the connecting rods dip and which splash cares for the cylinder walls and pistons. The

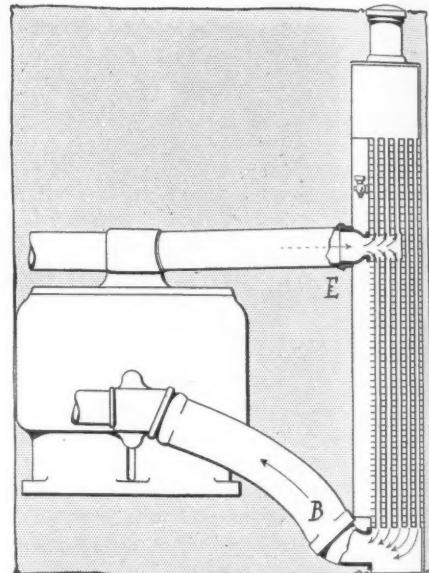


FIG. 2—REGAL THERMO-SYPHON COOLING
company has added a fourth piston ring, placing it at P, Fig. 2, below the wrist pin. From the crankcase there is an oil

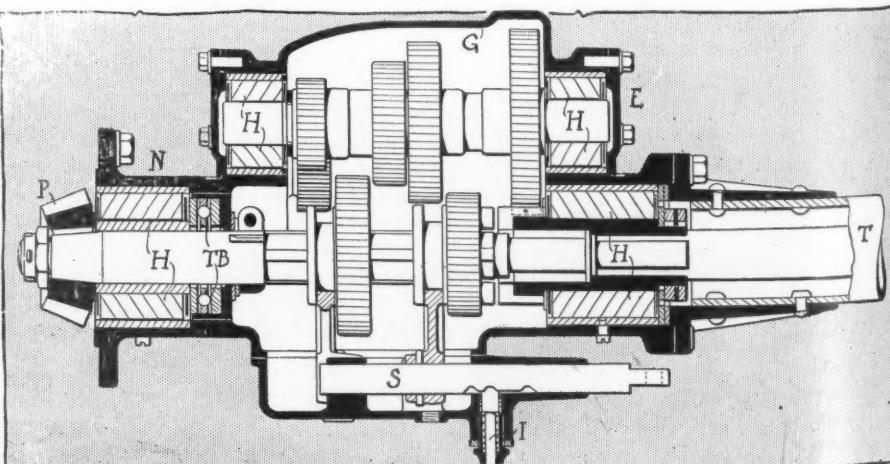


FIG. 3—THE REGAL SELECTIVE GEARSET NOW USES HYATT ROLLER BEARINGS

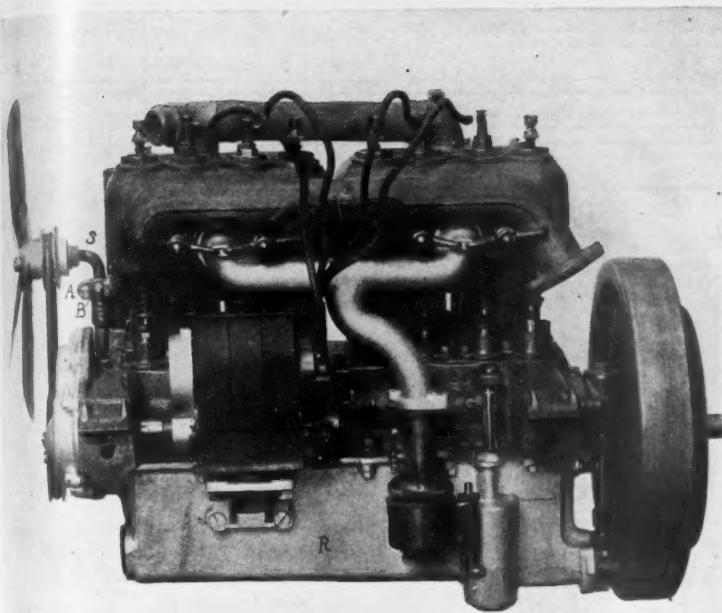


FIG. 4—G SHOWS REGAL OIL GAUGE

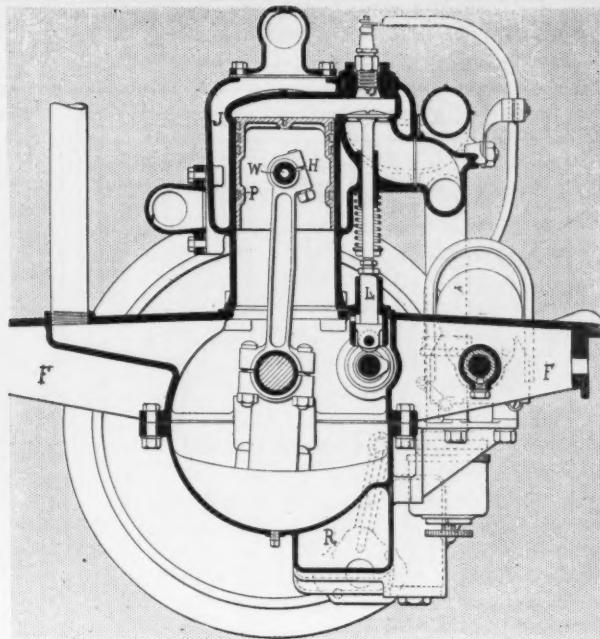


FIG. 5—END SECTION REGAL MOTOR

SPECIFICATIONS

Regal Thirty

Bore	- - - - -	4 inches
Stroke	- - - - -	4 inches
Horsepower	- - - - -	25.6
Wheel Base	- -	107 inches
Tread	- - - - -	56 inches
Cooling	- -	Thermo-Syphon
Transmission	- - -	Selective
Speeds	- -	Three Forward

overflow above a certain level back to the reservoir R, the oil of course being filtered before recirculated.

The only change in the thermo-syphon cooling system of the car has been the mounting of the fan adjustably in a bracket B, Fig. 4, on the front cylinder casting, instead of supporting as at present through brackets from the radiator. The bracket B is split and takes a pinching bolt A which serves to anchor the support S at any position required, according to the desired tension of the belt. The radiator position in the Regal is illustrated in Fig. 2, in which B shows the intake hose leading to the face of the water jacket on the non-valve side and E the return pipes to the radiator. These pipes enter the radiator lower than the top of the tube, thus leaving a pocket above the entrance. Because of this there is no steaming from the radiator as part of the water goes up and the remainder down, but any entrained steam, instead of oozing out through the overflow, has lost its heat in the water with which it has mingled before reaching the overflow. The radiator is located in the center line of the front axle. Figs. 4 and 5 show the general con-

struction of the motor, the latter being a vertical cross section showing the continuous waterjacket space J around the cylinder wall and head as well as the spaces around the valve chamber. The wristpin W is of alloy steel, heat-treated, hardened and ground to size, and the connecting rods are of I-beam section with a take-up H at the wristpin end. The crankshaft ends are of marine type with white bearing metal bushings. These bearings are hand-scraped. The crankshaft is a three-bearing forging, heat-treated, and with large bearing surfaces. In the valve mechanism, owing to the ample diameter of the valve head, the valve lift is not excessive and this is adjustable by the usual nut and lock nut at the top of the lifter L. On the lower ends of the lifters are rollers which bear upon the integral cams of the camshaft.

Changes in Transmission

Fig. 3, a plan section of the transmission, shows one of the important changes in this, which consists of the introduction of Hyatt roller bearings H for carrying the main and countershafts, these taking the place of the cup-and-cone ball bearings of the present season. This gearset is of the selective type giving three forward variations. N shows the neck of the gearbox G which bolts to the differential housing with the pinion P in rear of it and the usual ball thrust bearings TB. The forward end of the gearbox is a detachable plate E to which is secured the torsion tube T. Assembly is through this end. This tube is illustrated in Fig. 6, ending at its forward end in a ball B supported in a socket S on the cross piece F of the frame. Within this ball-and-socket support is a universal joint and in front of it is a short shaft supported direct from a cross member of the frame through a Hyatt roller bearing. Between this joint and the

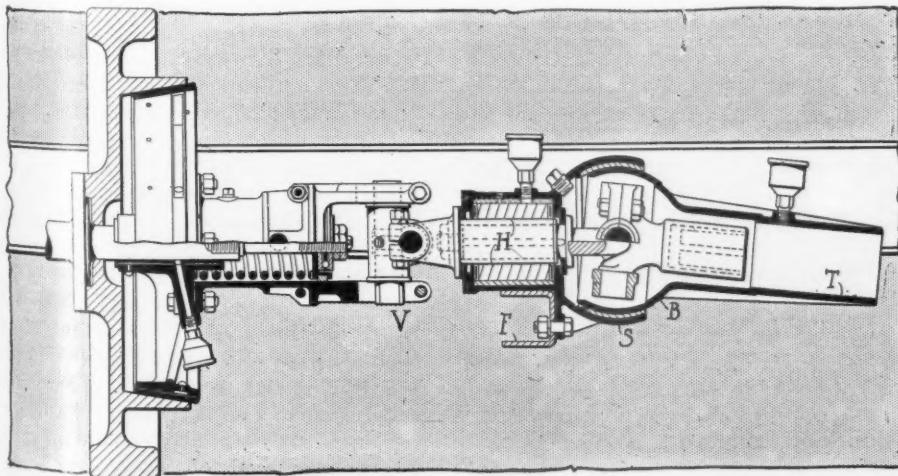


FIG. 6—FORWARD END SUPPORT OF REGAL TORSION TUBE

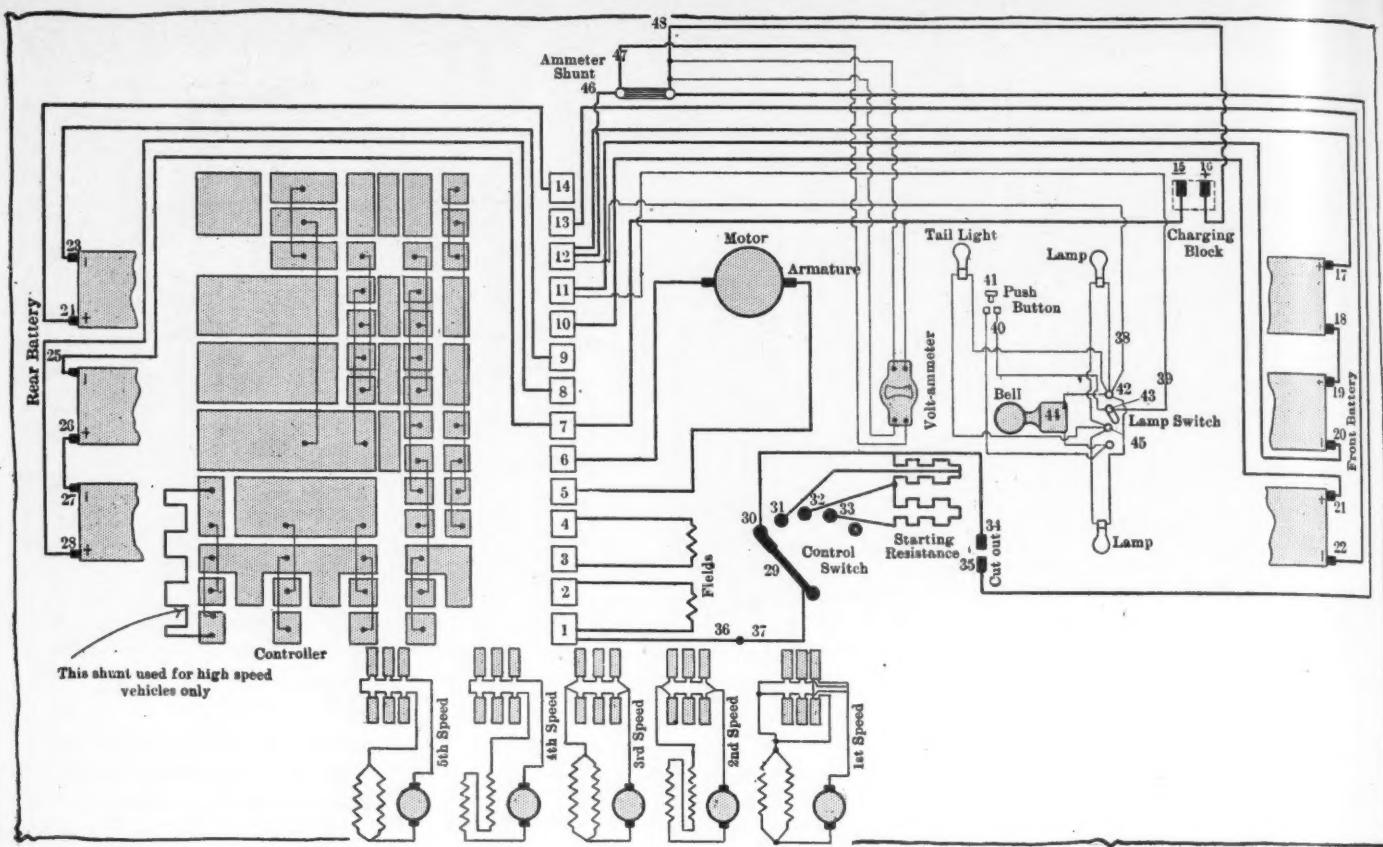


FIG. 1—COMPLETE WIRING DIAGRAM OF BABCOCK ELECTRIC

cone clutch is another universal V to compensate for any irregularities that might be set up between the motor and the short shaft H. In the gearbox both main and countershaft are short and these as well as the gears are made of nickel steel, which material is used in the Hyatt roller bearings. The shifter rods S are inclosed in the gearbox at the right side and the usual interlock I to prevent meshing of more than one set of gears at a time is fitted.

From the body point of view of Regal cars one of the leading alterations is increasing the tonneau space made possible by adding 2 inches to the wheelbase which now measures 107 inches as compared with 105. This 2-inch addition has resulted also, in lengthening the side members of the frame this much. But the change has not ended here. Additional comfort has been given the tonneau passengers by the addition of 4 inches in the width of the rear seat, making the touring car a most comfortable five-passenger vehicle. An important change in the body construction is the use of sheet aluminum which replaces the wood construction of the present season. Sheet aluminum gives a lighter construction and one which is claimed to hold the paint particularly well. There have not been any changes of moment in the body design. Of interest to purchasers is the new lamp equipment, the car now being regularly sold with gas headlights and generator as well as the conventional dash and rear lamps and horn. The body equipment is standard on all types.

Worm Drive a Babcock Feature

NOTHING evidences the progress being made in and the attention devoted to the electric vehicle than the cursory analysis of the new 1910 Babcock model 11, a product of the Babcock Electric Carriage Co., Buffalo, N. Y. Babcock model 11 differs radically in few respects from its predecessors. It is a landau type of car carrying forty-two cells of fifteen plate battery and with a current output of 140-ampere hours. Of foremost importance in this car comes the use of a Hendley type of worm drive where the power is transferred from the propeller shaft to the rear axle and which is illustrated at W, Fig. 3. This is the second example of the introduction of worm drive that is used in conjunction with electric vehicles in America; the first to come to the attention of Motor Age being the Maxim-Goodridge electric of a year ago, which, however, has not become a factor up to the present time. In the gasoline field in America the Mitchell Motor Car Co., has used worm drive in its commercial vehicles for several seasons; and in England worm drive has received considerable attention for years, the Dennis company employing it solely in its heavy commercial vehicles and the English Daimler using it to transmit from the mainshaft to the jackshaft in its chain-drive cars. Because of the success obtained from the Hendley worm system the Babcock accepted this principle. It is practically noiseless, there being none of the hum of the bevel drive so common with shaft-driven vehicles. The efficiency of it

is well demonstrated by the coasting ability of model 11, irrespective of the fact that not a few worm drives are almost irreversible, which is to say that the worm will readily drive the wheel but the wheel will not readily drive the worm.

Besides the adoption of worm drive to the rear axle, this axle contains another interesting construction in the manner of locking the rear road wheels on the axle driveshaft. This is illustrated in Fig. 2 in which A represents the axle driveshaft which is squared at the part Q where it engages a broached conical member B and which in turn engages the cone face C of the hub. Due to the pressure of the nut D on the end of the axle and the prevention of rotary motion by the keys E, there is a positive lock between the shaft A and the hub C. The advantages claimed for this construction are that the parts cannot work slack, that noise is eliminated and repairing practically obviated. A still further step forward in conjunction with the Babcock electric and one designed to reduce noise in the car is the introduction of non-adjustable ball bearings for the rear axle and road wheels.

The running gear of this landau is designed for easy riding, several factors combining in this respect: First, might be mentioned the use of 32 by 4½-inch front and rear pneumatics; second, comes the use of laminated wood frame, the resiliency of which has been tested in laboratories by manufacturers of gasoline cars during the last few years; third, is the adoption

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of Perfection type of springs in front and rear, Krupp steel being used in these.

The electrical system of the Babcock model 11 has been as carefully worked out as has the constructive detail of the running gear. Fig. 1 shows the general layout of the wiring and battery diagram of the car, with a series wound motor designed for five forward speed variations. The connections, coming from the battery, lead to a drum type of controller, through the contacts numbered 7, 8, 9 and 14 at the rear, and from the front battery to contacts terminals numbered 10, 11, 12 and 13. From 6 a lead passes to the motor armature and thence to 1, 2, 3, 4 and 5 connect to the fields of the motor. Contact No. 1 also leads to the lever of the foot control, through resistances 31, 32 and 33, or evading resistance, when the lever 29 bridges to 30.

The several combinations required to give the first, second, third, fourth and fifth speed are shown at the lower part of the diagram, and remembering that the combinations may all be made in succession, at will, by moving a single lever, the time will be propitious to divulge the use of the resistances as above referred to, since it is obvious that the control might be made to serve without the resistance, which is but a matter of leaving the lever 29 in the position which bridges to 30, hence shunting the resistances 31, 32 and 33.

Since the lever 29 may be worked independently of the drum control lever, the operator of a car has two choices, that is, the five separate speeds may be used by means of the lever of the drum control, without resorting to the pedal 29, or with the drum control on any one of the five speeds, the pedal 29 may be used to start, control and speed the car up to any limit fixed on the drum control. To go into reverse, however, it is necessary to throw the drum lever into the reverse position before the pedal will be of any service to the driver.

Of the remaining connections little may be said since they are for lighting, signaling, charging, metering, etc., nor would it seem to be necessary, at this time, to elaborate upon the advantages of electric lighting, etc. The great question involves the principle of the use of separate resistances in the auxiliary control, thus rendering the operation of the car so simple and sure that ladies may drive with safety, and economical conditions obtain, since the resistances are merely auxiliary, serving to abort the consequences of forgetting how the controller may be set and allowing of free use of both hands in a tight quarter, by substituting foot manipulation of the resistance lever.

The Babcock battery is of the type as originally brought out by Camille Faure in 1881, but improvements wrought since that time have reduced the whole to a wholesome basis, involving qualities as follows: The wiring system is protected at every

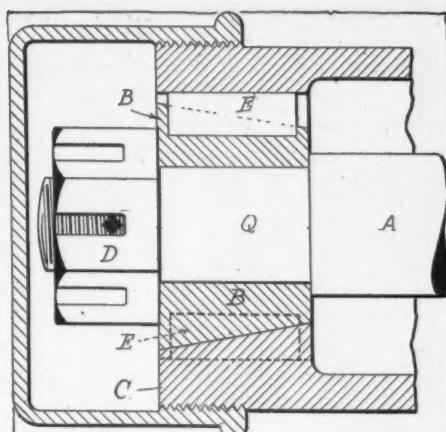


FIG. 2—BABCOCK WHEEL ATTACHMENT

point by the use of American circular loom, which is an insulator of permanence and acid proof to all intents and purposes. All terminal connections are made of non-corroding Tobin bronze. The sizes of conductors used are such that undue heating is not possible and the drop in the electrical system is therefore within economical limits.

Speed combinations are as follows:

First speed: three groups of fourteen

cells of battery in parallel and motor fields in parallel. Second speed: two groups of twenty-one cells of battery in parallel and motor fields in series. Third speed: two groups of twenty-one cells of battery in parallel and motor fields in parallel. Fourth speed: all cells of battery in series and motor fields in series. Fifth speed: all cells of battery in series and motor fields in parallel.

With a motor of adequate power, battery of ample output, it follows that good spring performance is desirable to eliminate battery troubles, by way of broken jars, loss of electrolyte, etc. In the meantime, in order to insure this performance under the most severe conditions, the Babcock designers, having located the most prolific cause of battery derangement, designed and adapted the plan of crating and holding the battery in oak crates, or trays, in sets, and when the sets are put in place a clamping device delivers a uniform pressure on all the jars, independently of the crates and prevents any relative motion at all. In electric carriages the carrying of the battery is one of the important features to be carefully looked after by the designer.

France Counts Cars, Finds 44,769

Paris, Sept. 28.—According to the statistics issued a few days ago by the government there were 44,769 motor cars running in France on the first of this year. This number, however, is made up exclusively of cars which pay full or half taxes such as pleasure vehicles and cars for commercial purposes, but does not include taxicabs and motor omnibuses, which come under another classification. This total of 44,769 shows an increase of 7,183 cars over the total recorded on January 1, 1908. On the similar date in 1907 the records show 31,286; in 1906 the total was 26,262; in 1905 it was 21,523; in 1904 the total was 17,017; in 1903 the total was 12,984, while for the years 1900, 1901 and

1902 the total was respectively 2,897, 5,386 and 9,207. Among the 44,769 registered cars there are 25,269 which are called voitures de luxe, which are subject to the full taxation, and 19,500 or commercial vehicles which are assessed half of the tax levied upon the other kind of cars. In horsepower the 44,769 cars represent 569,276 or an average of 12 horsepower per car. Taking the horsepower of the 7,183 cars which have been added to the record of 1908, the horsepower is 125,755 or an average of 17 horsepower per car. The largest number of cars is to be found in the department of the Seine, which includes Paris. The records show 9,152 or 1,042 more than a year ago.

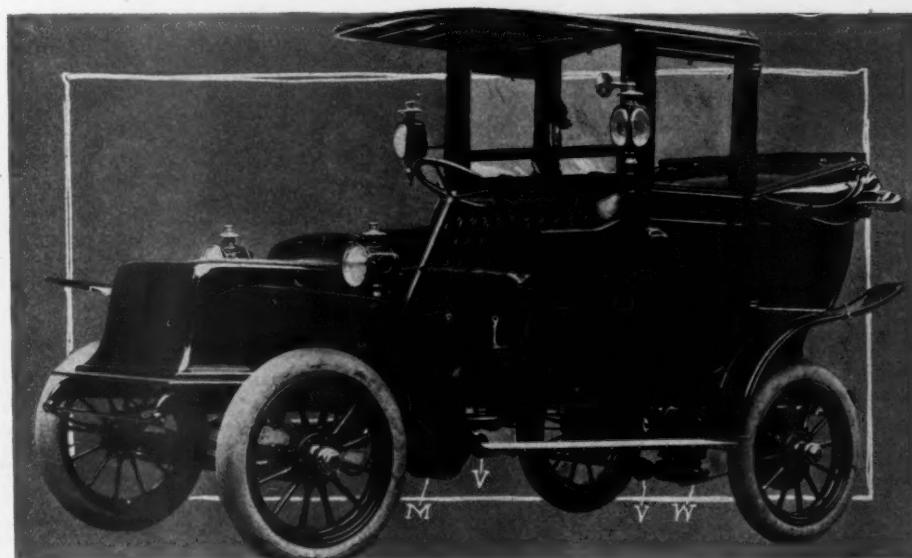


FIG. 3—BABCOCK MODEL XI ELECTRIC LANDAU

Anderson Electric Cars

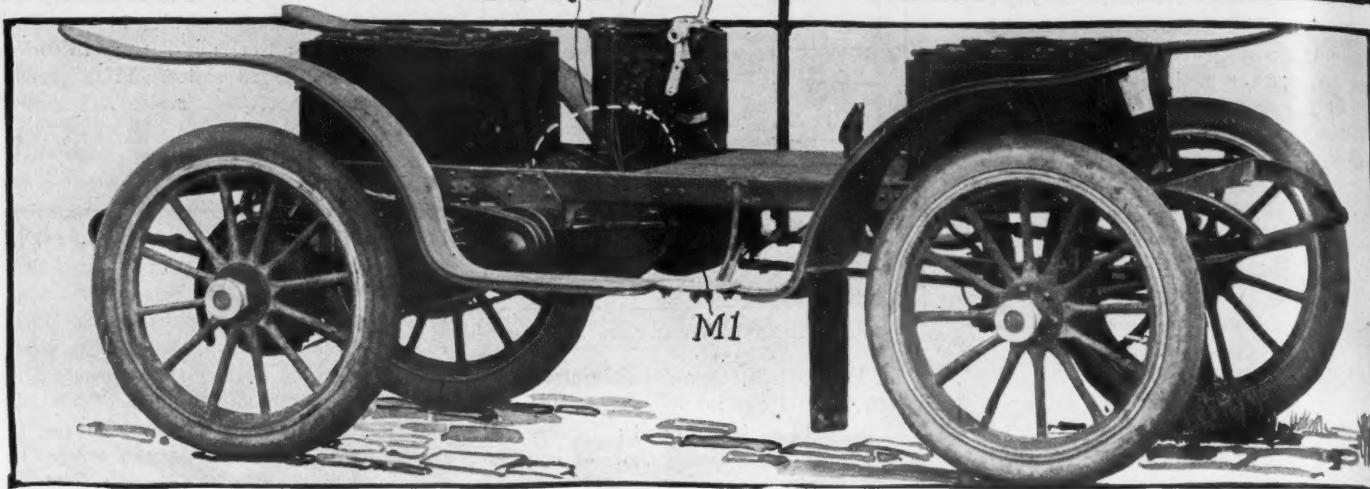


FIG. 1—DETROIT ELECTRIC, MODEL D, 1910, MADE BY ANDERSON CARRIAGE CO.

CONSIDERABLE improvement is shown in the Detroit model D electric brougham which the Anderson Carriage Co., Detroit, Mich., is marketing for next season. This brougham carries twenty-four cells 13 M. V. battery divided into two units, as shown in the chassis illustration Fig. 1, twelve cells being at the forward end under the hood, and twelve under the rear seat. The most notable change in this model and one which shows a trend in electric vehicle construction is that the position of the motor is lowered considerably as compared with the present season, when the motor location has been approximately, as indicated by the semi-circle *M*; but in the model D as shown here it is at *M1*, below the floor level of the car and slightly forward. The new location means a lower center of gravity for the car. Its exact mounting is shown in Fig. 2, in which *J* is the jackshaft or countershaft, and *M* the motor located in the same horizontal plane. Transmission from the motor is through a Renold silent chain inclosed in the housing *R*. On each end of the jackshaft are fitted raybestos expanding brakes *B* and, as shown in Fig. 3, which is an end of the rear axle of this car, another set of expanding raybestos brakes *B1* is fitted. In addition to this there is a fifth brake which is a clamping band on the motorshaft within the housing *B2*. This latter brake is operated through the controller handle. A conspicuous improvement on these models is the stout type of radius rod *R*, Fig. 3, these rods of the lattice type have an end similar to a connecting rod where they span the rear axle and carry on their forward end a ball for a ball-and-socket connection with the frame. This year the rod is of round section.

A few changes have been made in the controller, Fig. 3, it being arranged to give five forward speeds of 5, 8, 13, 17 and 22 miles per hour respectively. The shoe *S*

on the controller handle passing through blades 1, 2, 3, 4 and 5 respectively for each speed. The illustration shows the controller in neutral. To reverse the polarity is changed by moving the two contacts *V* to the terminals *T* and away from the terminals *T1*, after which the controller lever goes to establish the usual contacts. A change in the controller is that the lock *L* is now on the top of the handle instead of on the body. The motor used is of the series wound inclosed type with a high torque characteristic. It has a low temperature coefficient and is intended to withstand heavy overloading for a considerable period of time.

The running gear of this model D is practically the same as that used on these vehicles for the present season. The framework is of pressed steel construction with channel side members. At the forward end are semi-elliptics; elliptics support the rear, and tubular axles are used in front and rear with Timken roller bearings for the wheels. The wheelbase is 79 inches, the tread 51 inches and 32 by 3½-inch tires are used all around. This model D with its brougham body weighs about 2,300 pounds.

The Anderson company will continue for next season its model L type of motor, illustrated in Fig. 4, in which the motor *M* is a unit with the rear axle, excepting in that it is partly supported through a pair of converging tubes *T* which find support near the center of the body. This motor has a double reduction Renold silent chain drive to the axle, one chain *C* being from the motor to the counter-shaft, and the other *C1* from this counter-shaft to the differential on the rear axle. Both of these driving chains are entirely inclosed. This car is fitted with three brakes, one set of expanding raybestos bands *B* operating within the rear wheel drums; the other a clamping motor brake.

Much of the electrical work in connection with these cars is done in the factory, the batteries being received in the green state. The trays holding the cells are made of selective grades of oak and put together by dove-tailing. The brass screws used to further bind the trays are countersunk and the jars containing the elements of the cells are closely nested together to prevent breaking.

MOTOR CAR LITERATURE

A new name seen in the catalog list is the Hudson Motor Car Co., Detroit, Mich., which has made its debut in an attractive book styled "The Hudson Twenty," one of the new 1910 products. The usual illus-

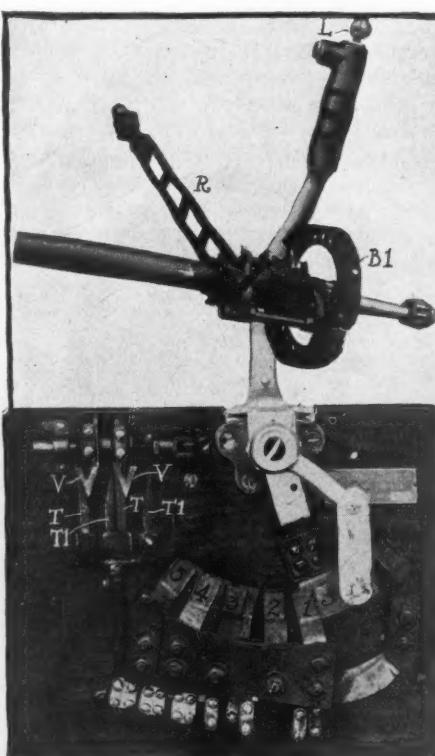


FIG. 3—DETROIT ELECTRIC CONTROLLER

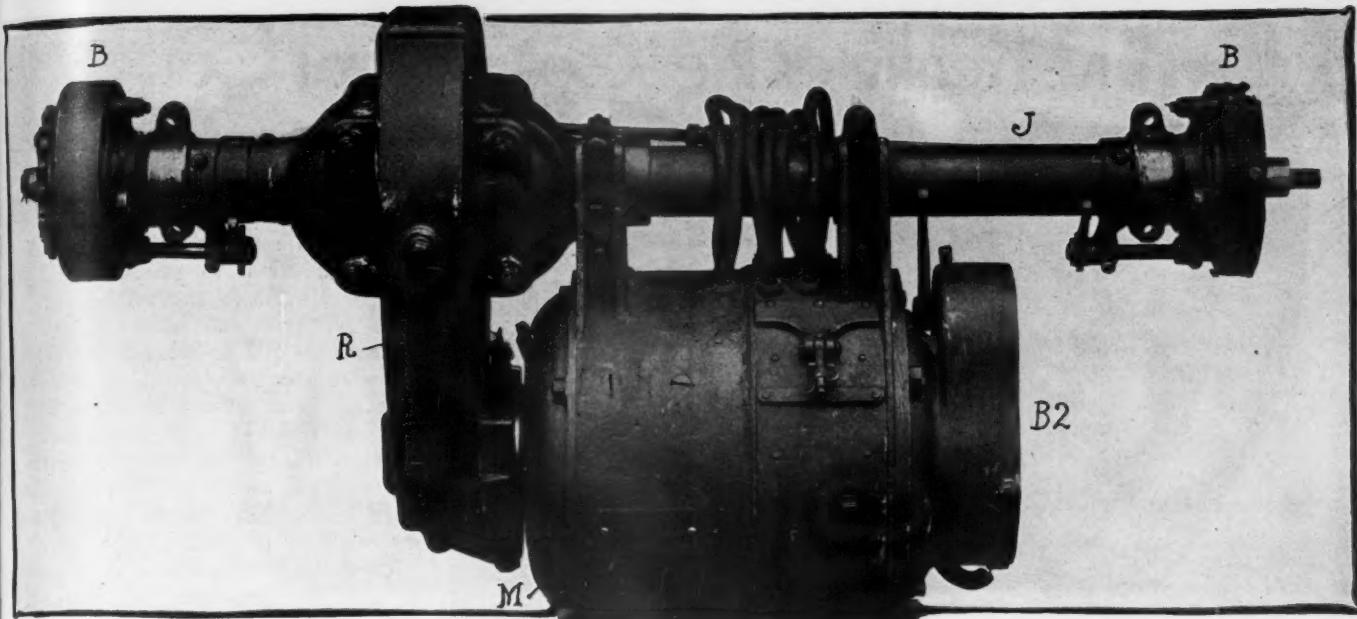


FIG. 2—MOTOR AND JACKSHAFT IN DETROIT MODEL D, 1910 ELECTRIC

trations, descriptions and specifications are included, and the last page is a brief history of the "men behind the Hudson."

The Automobile Club of Wichita, Kas., has recently issued its 1909-10 year-book, a blue-and-white, cloth-covered volume, containing many routes in and about Wichita, and several maps. The Kansas state law and the Wichita law and ordinances are also incorporated.

"Dixon's Foundry Facings" is a booklet by the Joseph Dixon Crucible Co., which will be of interest to manufacturers who do their own foundry work. The booklet is argumentative on the requirements of different facings applied to the surfaces of molds, for the purpose of preventing adhesion between the metal and the sand of which the mold is composed.

The 1909 Year-Book of the Chicago Automobile Club follows its usual style of opening with a list of officers for this and preceding years, copy of the constitution, by-laws, house rules and garage regulations. In the end of the book a list of members is published.

The latest commercial car literature from the Packard Co. is a large-sized postal card illustrating 3-ton Packard trucks engaged in merchandise delivery in New York city.

The Peerless Co. has issued a booklet on its car equipment for 1910. On the first three pages are illustrated wind shield positions, page 3 analyzes the baggage carrying possibilities of the rear trunk, page 5 shows tool equipment, and the succeeding pages show lamp equipment and tops for all of the different types of cars. The last pages illustrate the furnishings of the limousine interior.

In an advance folder the H. H. Franklin Mfg. Co., Syracuse, N. Y., announces its models for the 1910 season. Accompanying the announcement are six leaflets—five showing the different types and the other an X-ray view of engine.

An announcement for the coming season is that of the Bartholomew Co., Peoria, Ill., advising the trade that it will market two new models for next season to be known as the Special 45 roadster and Special 45 touring car.

The Diamond Rubber Co., Akron, O., has issued a catalog describing and illustrating its wire mesh base tire for motor trucks and commercial vehicles of every description. Attention is also called to its side mesh type. Another booklet from this concern is devoted exclusively to Diamond tires for motor buggies and high-wheel vehicles.

From the Rockwell Furnace Co., New York, N. Y., is an illustrated catalog on furnaces for heating, forging and welding.

The B. C. K. Motor Car Co., York, Pa., has mailed to the trade its catalog which describes and illustrates in a conventional manner the Klinekar, which is marketed in both pleasure and commercial types.

An exceedingly dainty creation is the "Winton Six" which is the title and subject of a booklet from the Winton Motor

Carriage Co., Cleveland, O. The book discusses the difference between six-cylinder and four-cylinder cars, not merely from a theoretical point of view but from the standpoint of actual service. Included is a description, as well as specifications and illustrations of the Winton 1910 48-horsepower six-cylinder model.

A simple yet attractive catalog is from the Broe Carriage & Wagon Co., Cleveland, O., describing its electric stanhopes and coupes. The cover is a simple affair of gray stock with embossed gilt letters.

Gasoline and oil storage outfits are described in a conventional manner in a catalog from the American Oil Pump & Tank Co., Dayton, O. The long-drawn pumps and storage tank outfits are pictured and described for public garages, the sidewalk tank outfit suitable for those so situated that the former pump would not be practical, the Little Monitor long-draw gasoline storage outfit designed for private garages, etc. A full-page illustration shows a garage equipped with one of these storage outfits.

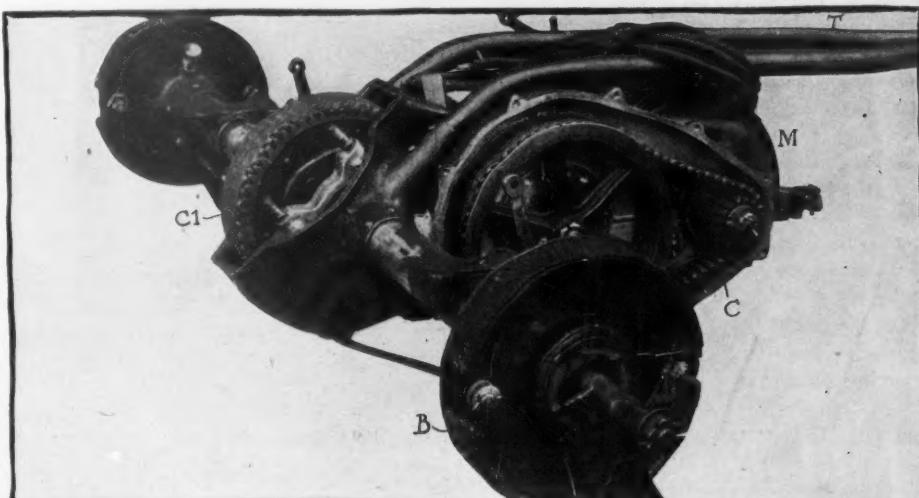


FIG. 4—COMBINED MOTOR AND REAR AXLE IN DETROIT MODEL L

The Realm of the Commercial Car



HEATER USED FOR PLACING CHANNELS ON WOOD WHEELS

MAKERS of pneumatic tires for motor car use fancy they have to cater to a variety of tastes when they have to list thirty different sizes, yet the concern which caters to the solid-tire trade has to give a range that is more than five times as great as the air advocates, and even at that, it is called upon to furnish odd sizes which probably will add materially to the worries at the factory. The solid-tire contingent is growing daily because of the wonderful development of the business in motor buggies and commercial trucks, which demand their share of tires. It was not until the other day, though, that attention was called to the versatility of the maker of solids; then a chance remark brought out the fact that one concern—the Firestone—actually lists 266 different sizes of solids, whereas the pneumatic division probably will average about thirty. It will be remembered, though, that in the case of the pneumatics the wheel sizes range generally from 28 to 36, occasionally a 40-inch bobbing up; but with the solids the wheel sizes run all the way from 28 to 64 inches, and to be able to care for them all it is necessary to list 266 different sizes of tires. This, it is claimed, is brought about by a lack of standardization among users of solids, nearly every big concern using them having a different size of wheel rim.

In its line of solids the Firestone company divides it into four types. First there is the internal type for carriages, the size ranging from $\frac{3}{4}$ -inch to 2-inch base and in two grades. Second comes the side-wire carriage tire, running from $\frac{3}{4}$ to 2-inch; third is the bus side-wire type, a $2\frac{1}{2}$ -inch tire for use on extremely heavy horse-drawn vehicles, and fourth is the side-wire motor tire, the Leviathan of the business,

Solids For Commercial Use

a huge tire, the largest of which is for a 36 by 8-inch wheel and which weighs 140 pounds and lists at \$162.50 each. These truck tires will stand a wonderful amount of service, as is demonstrated by the reports on file, there being instances of one rear that has done 16,000, while one of the fronts of the same set has covered 20,000 miles and still is in service. In getting this big mileage due credit is given to the driver, for it is stated that the life of a tire largely depends upon the man at the wheel. Also it is pointed out that speed is a most important factor and the complaint is made that some of the makers of commercial cars err when they so gear a machine that it is capable of a speed of 25 miles an hour. Such a car in the hands of a careless driver is likely to be run to its limit, and the tire suffers.

A commercial wagon should not be capable of running faster than 15 miles an hour, it is asserted by the tire maker, and if a car is so geared it will give 50 per cent more tire service than one that can travel 25 miles an hour. As an example of this it is pointed out that users of electric pleasure or commercial cars get great mileage results because of the slow speed at which they travel. Because of this very slowness, they get from 30 to 40 per cent more out of their tires than do the users of the faster gasoline machines, it is claimed.

Of course the user of a solid does not have to fear punctures, and indeed it is claimed he has not much over which to worry. In the case of the Firestone it is stated that the main trouble that develops is that a tire sometimes separates at the base. This side-wire construction is a Firestone idea. In building steel crossbars are inserted and vulcanized into the rubber at regular intervals near its base. These crossbars remain embedded in the rubber and become an integral part of it, providing a solid base. Two endless retaining wires are used, one on each side, being forced over the edges of the channel so that they press upon the shoulders formed by the crossbars, thus holding the tire in the channel. When trouble develops it generally is found that some of the crosspins have pulled out so that the base is separated from the tread and the side wires are loosened. This is easily remedied, though, and if the tire is sent to the factory the base may be re-vulcanized and new crosspins inserted at a cost of one-sixth less than list price, and the tire placed in condition to render 33 $\frac{1}{3}$ per cent of its original service.

It is impressed upon the users of solids that great economy of tires may be had if the driver is careful. Slow speeds not



FIRESTONE STOCK OF SOLIDS IN CHICAGO BRANCH

over 15 miles an hour will produce 50 per cent more tire service, and the main points impressed upon users is that overloading and overspeeding are the greatest causes of tire expense. Drivers are warned to keep the brakes working equally and to have all the wheels trued up, which not only saves the truck but prevents any unnecessary strain on any one of the tires. Oil and grease on tires will cause rubber to decay and exposing the tires to great heat destroys the wear-resisting properties of the rubber. A driver is taught to start his truck in a straight line before turning the steering wheel, because by turning the front wheels when the truck is standing still a heavy and unnecessary strain is placed on the fastening device of tires of any make, it is claimed. A driver should start gradually and avoid jerky motions. He should not run along street car rails, which practice grinds down the edge of a tire.

Each Firestone branch is fully equipped to care for users of solids in the way of repairing old tires or fitting new ones. In the repair line it has been found that where a tire has been injured by a cut or a tear, the injured portion may be cut out and a new piece inserted without impairing the tire's strength. At the Chicago branch the equipment is such that everything save the woodwork can be cared for there.

Particularly interesting is the machine used for applying the side-wire tires. First of all, the side wires, which are of cold-drawn Swedish wire, are brazed, a strong union being formed and the wires made circular in shape. This operation completed, the wheel upon which the tire is to be fitted is placed upon an axle rod after the tire has been placed on the rim or in the channel. A steel band is placed circumferentially around the tire to hold it in place while the side wires are being applied. The machine that places the wires in position is a special device. A vise-clamp is pushed to the wheel and fastened to the channel, with the retaining wires in place on the opposite sides of the rubber. With everything in place, the next operation is that of slipping the wires on. The vise-clamp is attached to a lever which works on a ratchet. At each pump of this lever a section of wire is slipped on, until it gets down to the last few inches. At this point the utility of the special device comes into play, for it is doubtful if human power could slip over those last few inches. But the lever turns the trick and the wires snap on prettily and the job is complete save for tamping the wires to insure everything being snug and solid. At the Chicago branch as much as \$1,000 worth of solids is applied in a day.

Also interesting is the dual solid motor tire, which is formed by applying two single tires on the same wheel and which is recommended where the truck and load

weigh 3 tons or more, the claimed advantage over a single tire larger than 5 inches being that it gives four positive and independent points of fastening; that the ratio of base support is increased 25 per cent; that the greater surface area affords more resilience by allowing more escape for the rubber under pressure, and quicker radiation of heat; that two treads are better than one in affording a better ground grip, less skidding and readier traction; more economy in repair, an accident seldom affecting both tires at the same time.

UNDERTAKER A CONVERT

A Baltimore undertaker is the latest person to discard the horse and take up the motor car for business purposes. E. Madison Mitchell uses a motor wagon and finds, after 7 weeks of service, that it does the work of three horse-drawn vehicles. The motor wagon is a 40-horse-power machine.

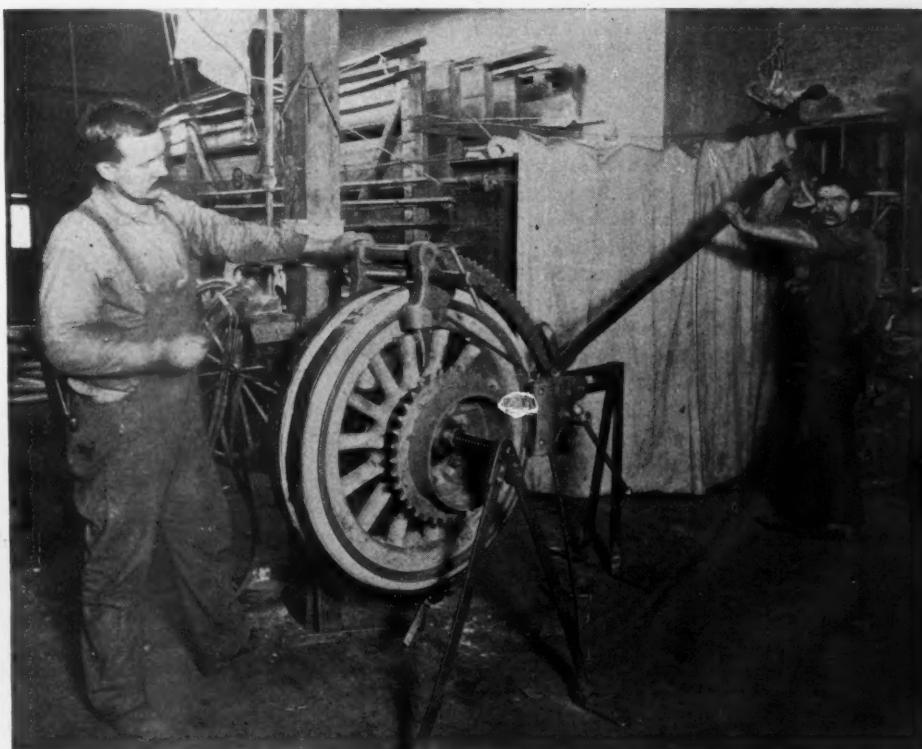
COUNCIL BALKS ON MOTORS

The city council of Indianapolis has passed the budget for city expenditures for the year 1910, but not until after having either reduced or eliminated the motor recommendations made by Mayor Bookwalter. The items eliminated were those appropriating \$5,800 for a motor fire engine and \$2,500 for a new motor patrol wagon. The reduced items changed the appropriation for the maintenance of the police cars from \$3,600 to \$2,500 and for the maintenance of the car owned by the board of public works from \$1,000 to \$500. Until this time the city has made rapid progress in adopting motor cars for municipal purposes. The police department has two patrol wagons, a touring car and

a runabout and some seven or eight additional cars owned by the city. Should the new administration, which will take office January 1, wish the cars refused by the present council, it can obtain them through special appropriations.

MORE CARS FOR MILWAUKEE

The city of Milwaukee has spent \$25,000 for motor cars for municipal departments during 1909, this figure being completed last week by the decision of the council to purchase a \$4,500 touring car for the chief of the fire department and a \$1,000 runabout for the health department. The requests of the water works department and the city engineer were deferred, probably until next spring. Chief Clancy of the fire department has been using a Mitchell touring car for about 2 years and found it so satisfactory that he some time ago urged the purchase of cars for each assistant chief. The first assistant will now be given the Mitchell and the chief will use the new car. As finances permit each assistant will be granted a runabout. Chief Clancy's request was met without objection. He explained that the results of 2 years' use of the motor car have amply justified the expenditure. Maintenance of his present car was not over \$15 a month, whereas it cost from \$30 to \$45 to keep two horses, which each chief must have for his own use. Horses, too, are higher in price than a year ago, an ordinary animal costing \$275 to \$300. "I venture to predict," said the chief, "that in 10 years all fire fighting devices will be equipped with traction devices." Dr. G. A. Bading, health commissioner, has the privilege of selecting a car at \$1,000 as he sees fit.



DEVICE USED FOR PLACING SIDE WIRES ON SOLIDS

FRENCH WAY OF TESTING MOTOR MATERIAL



FIG. 1—CHEMICAL LABORATORY IN DE DION-BOUTON FACTORY IN FRANCE



FIG. 2—DE DION-BOUTON LABORATORY

THE accompanying illustrations show the chemical, metallurgical and mechanical laboratory with the various testing machines for determining hardness, brittleness and tensile strength of materials used in the construction of the de Dion motors and cars built at Puteaux, France. This laboratory of the Etablissements De Dion-Bouton is one of the thoroughly up-to-date equipments in Europe for the purpose of research and tests of materials which are required to withstand exceptional stress in motor car service. In the chemical laboratory, seen in Figs. 1 and 2, the composition of the steels and alloys used in construction of the engines and cars is determined. It is important to know the proportion of carbon, silicon and manganese as well as phosphorous and sulphur in the steel, also the special elements, such as vanadium, tungsten, nickel or chromium now so largely used.

The laboratory noted in Fig. 3, is equipped with a Heraus electric furnace, various thermo-electric couples, galvometers and other instruments for experimental work in determining the melting points of alloys and transformation points of different steel. When cooling steel is subject to internal changes during which the metal itself

changes as the heat is given off rapidly and it is desirable to know the temperature at which these changes take place.

The mechanical tests in the French laboratory includes the determination of the hardness of material by a Guillory machine, Fig. 7, and for testing the brittleness of the materials of construction a machine of the Guillory design, Fig. 8, is utilized. Various other testing machines are employed for determining the tensile strength as well as the elastic limit and shearing and bending test, the latter being carried out by a Fremont testing machine for this purpose. Fig. 5 shows the Fremont punching machine and Wiborg's carbon measuring apparatus, the latter being noted in the center of the illustration.

The machine for testing the tensile strength of materials is indicated in Fig. 6. The tensile strength is first obtained in the mechanical laboratory and then the ductility and the elastic limit, by means of the tension shearing and punching tests. Next the brittleness of the material is investigated by subjecting the specimens to sharp blows

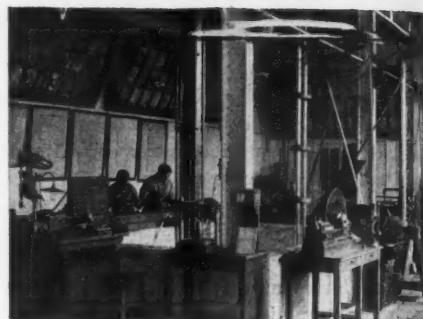


FIG. 3—ELECTRIC FURNACE

and finally the hardness is noted by means of the Brinnell-Ball system. After these tests have been made experiments are carried out with an annealed piece of metal and a hardened specimen, the hardening being done in connection with a Charpy electric furnace and oil or water is used as desired for the hardening of the specimens.

A special microscopic laboratory is provided consisting of two rooms, one for polishing and the other for the microscopic

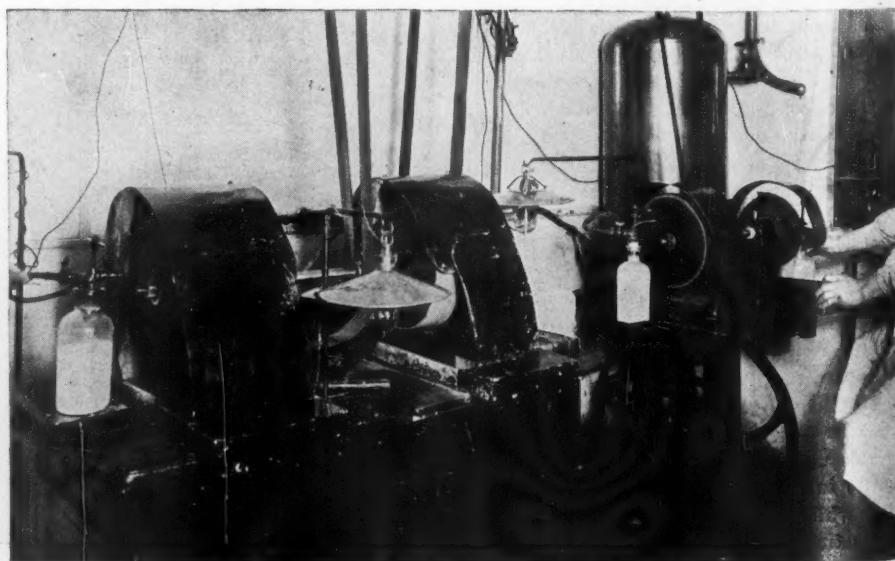


FIG. 4—POLISHING FOR MICRO-PHOTOGRAPHS

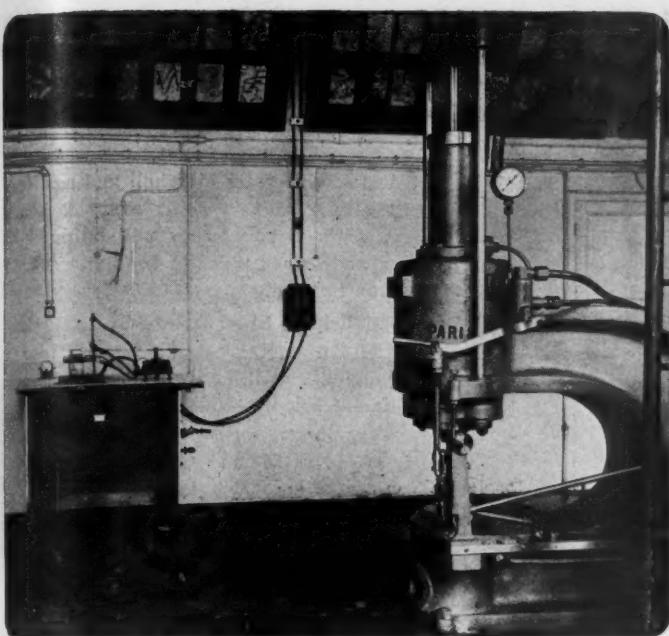


FIG. 5—PUNCH MACHINE AND CARBON MEASURING APPARATUS

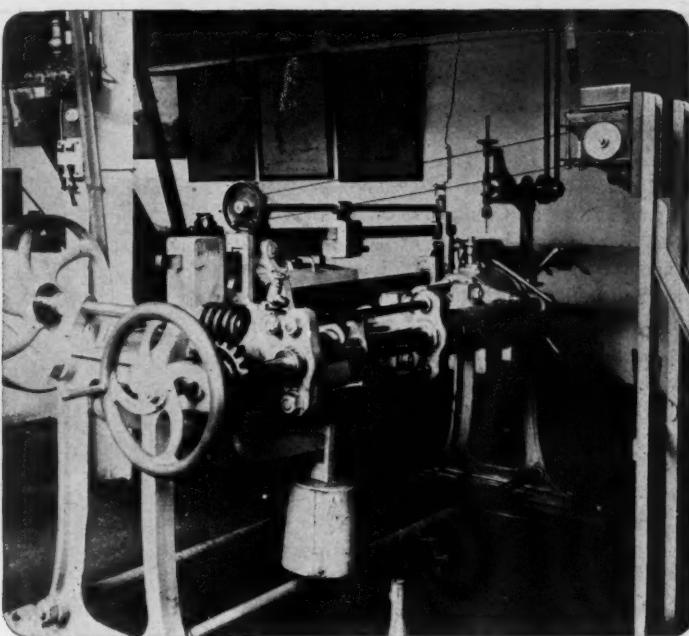


FIG. 6—TESTING TENSILE STRENGTH OF METALS

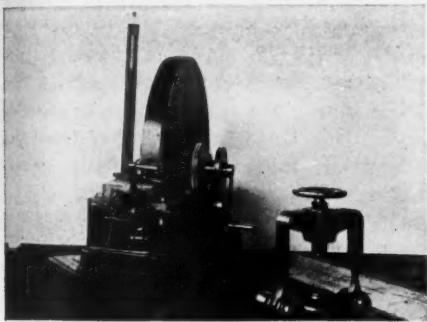


FIG. 7—TO TEST HARDNESS OF METALS

work. Micro photographs are taken of the various test pieces, several thousand samples being polished for this purpose, it is claimed, in a single day. The microscope room is provided with the finest Chatelier instruments. The Nernst lamp is used in connection with the micro-photograph camera for producing the necessary light in

taking these photographs of the highly polished steel test pieces, magnified many diameters. It is stated that these micro-photographs are of the greatest value in supplementing the chemical analysis and mechanical tests above mentioned. The illustration, Fig. 4, shows the polishing machine in the micro-photograph laboratory, while Fig. 9 shows the micro-photographic apparatus in service. A variable speed motor is used for driving the polishing machine seen in Fig. 4. By belt transmission ordinary polishing spindles are used, the disks running at a speed of 800 revolutions per minute. There is a tray of water under each disk to receive the dust and the floor is covered with oil as well, while the walls are kept as clean as possible, Ropolin paint being used, while only the polisher is allowed in this room. It is stated that steel specimens can be polished in 10 minutes with this plant and copper hard alloys in about twice that time.

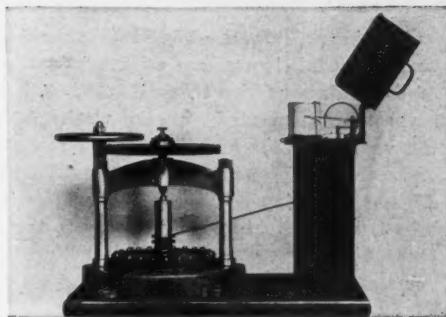


FIG. 8—TESTING BRITTLENESS OF METAL

In the polishing room the test pieces are first roughed out on a wheel of carborundum and then over the coarse grain emery wheel. The surface is then polished by the use of emery paper and emery polish, the test piece being polished in one direction on one paper and at right angles to this direction on the next paper. This gives a rapid polish and one paper tends to efface the lines cut in the surface of the test piece by the other paper.

The specimen is then finished on high-speed disks which are constructed of wood on which are fastened disks of zinc with cloth stretched over the surfaces, the polishing being done by alumina. Two-hour alumina is utilized at first and then 4-hour alumina, finally a still finer alumina is employed, this being placed in suspension in water and evenly distributed on the work by spraying.

It is claimed that the microscopic investigation at the de Dion Bouton laboratory have been of the utmost importance, the photographs of the polished specimens giving useful information with regard to the composition and treatment of metals,



FIG. 9—DE DION MICRO-PHOTOGRAPH APPARATUS





From the Four Winds

N S E W



Race Meet Abandoned—The proposed race meeting at Columbus, O., in October, was abandoned because of the fact that the horse racing in Columbus has been worked to its full limit.

New Way to Stop Drinking—Sheriff Robert Stevens, of Portland, Ore., has asked the county commissioners to revoke the license of any road house caught selling liquor to chauffeurs, and will ask the city to cancel the licenses of chauffeurs as well.

Date Set For Road Opening—The date now definitely set for the formal opening of the Berlin turnpike, the new 7-mile stretch from Hartford, Conn., to Berlin which obviates a detour by way of New Britain when motorists are en route for New York or Boston, has been set for October 22.

After Tire Thieves—The Milwaukee Automobile Club is making an investigation of complaints of tire thieves. Although a suspect was arrested several weeks ago, the vandalism has not abated, and reports of thefts are frequent. It is believed that a gang of Chicago thieves is working in Milwaukee and shipping the booty to their fence.

Lewis Gubernatorial Candidate—Announcement was made early this week of the candidacy of Captain William Mitchell Lewis, president of the Mitchell Motor Car Co., of Racine, Wis., for governor of Wisconsin on the Republican ticket. Mr. Lewis' decision results from urgent demands from leading members of the party, including Senator Robert M. LaFollette.

Postoffice Uses Motor Trucks—The Philadelphia postoffice is now operating five Autocar motor trucks in collecting mail in the northern and western sections of the city. These trucks have displaced nine horse-drawn wagons, and the speed with which the work has been done during the first few days has enthused the Quaker City postal authorities. It is understood that the government has agreed to pay \$3,000 per annum for the use of each truck with a driver.

New Clubs in Colorado—Following the example of the Denver Motor Club, many other organizations of the same kind are forming in Colorado. Gordon L. Wands, secretary of the Denver Motor Club, is continually receiving requests from motor clubs or parties wishing to form motor clubs, for copies of the constitution and by-laws of the Denver Motor Club. It is through the influence and help of the Denver club that organizations have been formed in the following places: Greeley, Ft. Collins, Boulder, Longmont, Colorado Springs, Pueblo, Trinidad, Canyon City, La Junta, Ft. Morgan, Julesburg, Rocky



CITY OF ATLANTA TROPHY

Ford, Florence, Las Animas, Grand Junction, Glenwood Springs, Cheyenne, Wyo., Tulsa, Okla., Garden City, Kan., Imperial, Neb., and many other places.

Will Think It Over—No definite action has been taken by the Columbus club on the question of withdrawing from the Ohio State Automobile Association because of the indifference of the state organization to the matter of expenses in carrying to a successful end, litigation saving state motorists thousands of dollars. A committee has been named to look into the question and report at another meeting.

Worcester Will Repeat—The Worcester Automobile Club, of Worcester, Mass., is preparing to hold its second annual endurance contest. The contest to be held in the latter part of November when the country roads are as rough as they possibly can be. The idea of the club is to make the contest as hard as possible and to use none of the state roads only where it is necessary. The distance of the contest will be about 200 miles with five controls and the other details will be along the same lines as the first one held last year. The checking points probably will

be in the Worcester city hall and each car will return to this point every 2 hours. During the 2 hours they will be out covering at least 40 miles of the hardest kind of country road.

Philadelphia Show Dates—The 1910 show of the Automobile Trade Association of Philadelphia will be held in the Second Regiment armory, Broad and Susquehanna avenue, during the week beginning January 17. J. H. Beck, secretary, is attending to the preliminaries at his office at 216 Odd Fellows' building.

Has Its Own Speedway—The Waterloo Automobile Association, of Waterloo, Neb., will hold its fourth annual racing meet October 21. About sixty entries have been made. The cars will race over a 2-mile straightaway speedway which runs along the Union Pacific tracks. J. C. Robinson is president of the club and C. A. Stenglein is secretary.

Centenarians Given Ride—Mr. and Mrs. Divis were given their first motor car ride from their home in Royalston, Mass., to Worcester this week by their grandnephew Professor Hollon Farr, of Yale university. Mr. Davis is 100 years and 8 months old and his wife is 90 years and 9 months old. When Professor Farr arrived at the Davis homestead he found Mr. Davis digging his potatoes in the field and upon being invited to ride he gladly assented to the first invitation and asked his wife to accompany him on it.

Will Build Own Roads—If the present plan of the county commissioners at Toledo works out, Lucas county, O., will in the near future do its own road building and repairing. By this plan it is hoped to save thousands of dollars. The project calls for a 10-ton steam roller, costing about \$3,500, and other necessary machinery and equipment, probably calling for the expenditure of about \$5,000. This plan is now in vogue in several Ohio counties and the commissioners have just returned from a tour of inspection, with considerable enthusiasm.

Fighting Motoring Evils—Philadelphia garage men have decided to organize against the joy ride and rake-off evil on the part of chauffeurs which has been flourishing in the Quaker City ever since motoring began to be popular. Last week the Philadelphia Garage Association was organized, and among its by-laws is a rule fining any member \$25 who pays a commission to a chauffeur, and upon failure to pay this fine the garage will be suspended from membership. Another rule of the association calls for the furnishing to an owner by the garage, on request, of a car check sheet, showing the movements of his car during each day of the preceding

month. Another feature of the P. G. A. will be the establishment of an employment bureau, to the records of which the clientele of the member garages will at all times have access.

Florence Has a Club—The Florence Motor Club has been organized at Florence, Colo. The officers of the club are: W. E. Mitchell, president; Dr. L. E. Rupert, vice-president, and E. F. Jack, secretary and treasurer.

Postponed to Spring—It has been decided by the Columbus club, because of the lateness of the season, to postpone the proposed old people's day until spring when all aged people who have passed the age of 70 years will be given an outing by the club members.

Southerners Are Confident—Harvey Granger and Frank Battey, of the Savannah Automobile Club, after a visit to New York, declare that if another grand prize race is held, which probably will be next year, that Savannah's chances of getting it are very bright because of the fine course and military protection.

Car Carries Rich Load—Shortly before noon every day a large car, W. L. Patterson's Pierce-Arrow, is backed up to the government building on the Seattle exposition grounds, and is loaded with gold bricks to be transported to the Seattle assay office. Very often \$150,000 has been transported in 1 day by the car. A half-dozen armed men, trusted employees of the government, accompany the car on each trip, under orders of Chief Assayer Vilas.

Michigan Wants a Road Race—Citizens of Grand Rapids, Mich., favor a national road race and eight representative business men have volunteered to go on a committee of ten, each member guaranteeing to raise \$1,000 toward the securing of the event. E. A. Skae, E. S. George and J. J. Ramsey, of Detroit, officers of the Michigan State Automobile Association, will be in Grand Rapids within the next 10 days to confer with President J. R. Jackson and Secretary F. C. Warnshuis, of the local club, the men composing the executive committee of the state association. At that time the race question will be discussed.

Balked in Road Plans—Morton F. Plant desired to construct a stretch of road of macadam and tar in the towns of East Lyme and Old Lyme at his own expense, but declares that State Highway Commissioner Macdonald would not permit him to do so. Had he been allowed to build the road it would have cost him about \$30,000 and there would have been no expense to the state. A representative of Mr. Plant and a contractor went about New England looking over various stretches of highway in order to determine just which best withstood motor car travel and it was finally agreed that a road of macadam and tar similar to that used in Rhode Island best met the conditions imposed by continuous motor car traffic. Much of the

mechanical equipment for the construction of the road is already in transit, but will not be used as the highway commissioner has let the contract for the construction of the 3-mile stretch to a contractor.

Shows Signs of Life—The Bay State A. A. of Boston, is taking on a new lease of life and at its last meeting a few days ago nine new members were elected. The club lunches, which are a feature of the fall and winter, have been resumed. There is talk now of having another endurance run some time in the fall.

Test Fails to Materialize—The expected test of a recent order of the Milwaukee common council prohibiting motor cars from occupying any portion of Grand avenue or Wisconsin street longer than to permit passengers to enter or alight did not come to pass. A. C. Runkel, an attorney, intentionally violated the law, but when the case was called, he found that the charge had been made disorderly conduct. He was fined \$1 and costs.

Janitors as Police Scouts—Since the matter of appointing the janitors in the various Sioux City schools as special police for the suppression of scorching, motor car owners say that they are getting the worst of it. One driver, having learned of the proposed action, slowed up almost to a snail's pace in passing the school when children ran out in front of his machine, climbed over the car and jeered at him. He was compelled to stop and the car was immediately taken possession of by the youngsters and he had to call the police. Several other motorists have reported similar experiences.

Atlanta Trophy Fine One—The \$10,000 Atlanta trophy which will be contested for during the 5-day race meet of the Atlanta Automobile Association, to be held on its new 2-mile motor car speedway at Atlanta, Ga., is 6 feet high, and made of solid silver. It is a representation of the mythological god of speed, Atlanta, running away with the Greek goddess Atalanta. Atlanta has outspread wings to assist him in his speed, and the maiden he holds in his arms holds the laurel leaves of victory in one hand and a motor car of gold in the other. Around the base of the trophy is the picture of a motor race, be-

low which are the seals of Atlanta and of the state of Georgia. Around the base the cotton bale is worked in in an artistic manner. The corners of the trophy are adorned by eagles with outspread wings.

Chicago's Latest—The city council of Chicago last Monday night passed an ordinance which prohibits a car or vehicle being left on the streets in the loop district more than 1 hour at a time without an attendant.

Badger Legislators Investigating—A tour of inspection and investigation into surrounding states has been started by the special legislative committee on good roads of the Wisconsin legislature. The committee will report bills to the special session in January. The committee is now in Michigan. It recently attended the national good roads convention in Cleveland and gained much valuable information.

Columbus to Have Show—Action was taken at a recent meeting of the Columbus Automobile Club, of Columbus, O., for a motor show to be held some time in January or February at the Columbus Auditorium. The sentiment in favor of the show was so enthusiastic that there was no opposition and a committee consisting of Perin B. Monypeny, Fred H. Caley, O. H. Perry, Herman Hoster and N. O. Aeby was named to arrange the details. An effort will be made to secure a date between the time of the Cleveland and Cincinnati shows.

Canadian Militia Uses Car—An accompanying illustration shows a scene at the recent inspection maneuvers of the Canadian troops at Winnipeg. At the extreme left of the picture as one faces it is General Otter, who is in charge of all the forces in Canada. Next to him is Captain Ketchen who is in charge of the barracks at Winnipeg and at the further end of the rear seat is Colonel Steele of the Strathcona Horse, who is well known for his service in South Africa. On the forward seat is Captain May, of England, and beside him is C. L. McLaughlin, of Winnipeg, the owner of the 28-horsepower Franklin touring car in which the officers at the time shown were engaged in an inspection tour of the Canadian camps.



CANADIAN MILITIA OFFICERS USE CAR TO INSPECT TROOPS



Legal Lights and Side Lights



DENVER GETTING DRASIC

CONTEMPLATED changes in Denver's motor ordinances now in process of drafting may prohibit the use of Fifteenth, Sixteenth and possibly Seventeenth streets, from Tremont to Lawrence street, to motorists and motor cyclists; make the duration of the operator's license 1 year instead of for life, and compel all public garage companies and owners to pay a license fee subject to fire and police regulations. The ordinances will embrace the features found so necessary in the large eastern cities where crowded traffic conditions have made it necessary to restrict the use of streets to machines. The ordinance for the licensing of garages is already drafted and will be presented to the city council for action some time this month. The other two ordinances are now in the making and it is possible all three will be put before the council together.

INDIANAPOLIS ENFORCING LAW

Acting under instructions from the board of public safety, the police of Indianapolis have begun the enforcement of the two recent motor ordinances. The first of these forbids any person under 17 years old driving cars, requires the use of mufflers and the display of red lights when cars are left standing in the street at night. The second requires registration of all persons driving cars, the fee for which is \$1. Some twenty arrests for the various offenses named in the measures already have been made, several persons being fined \$1 and costs, amounting to \$11, others being dismissed. About 2,000 persons have applied for registration so far, although it is estimated 5,000 persons drive cars or ride motor cycles in the city. There is a disposition to fight the registration measure and small clubs for the purpose are being organized over the city. The ordinance requires every person driving a car to have a registration badge, whether the owner of a car or not. Some families have been compelled to purchase four or five badges, while some of the factories have taken as high as forty badges for their testers and other employees.

MAKING DRIVERS REGISTER

The new rule in St. Louis, by which all persons, except owners, who operate motor cars must be registered with the secretary of state is being complied with admirably according to Chief Creecy of the local police, who has been seeing that the law was enforced in St. Louis. The order was based on a law passed in 1907 but never enforced until now. The large number of recent arrests for incompetent driving cause Creecy to issue the order. The statute reads in part: "Every per-

son hereafter desiring to operate a motor vehicle as a driver shall file in the office of the secretary of state a sworn statement containing his name, age and address, and the trade name, style and motor power of the motor vehicle he is competent to operate on a blank to be prepared and furnished by the secretary of state for that purpose."

WANTS LIGHTS ON NUMBERS

The chief of police of Topeka, Kan., has adopted the method of publicity in dealing with motorists who violate the law. Last week he caused to be published in the newspapers of Topeka a list of motorists who are habitual violators of that ordinance which provides that rear lights on machines shall reflect a white light on the number of the car. Out of the kindness of his heart the chief has refrained from making embarrassing arrests because the offense is not a great one in the eyes of the owners of machines. The facts are that there are but few lamps on the machines which show the number. The chief says that if the publicity method does not rectify the abuse he will adopt the old-fashioned method of arrests.

OPPOSES INCREASED FEES

Motorists in Franklin county and central Ohio are up in arms over the recommendations of the special tax commission named by the senate of the Ohio general assembly. The report which has been completed will recommend that the fees for registering motor cars be increased to a large degree in order that more revenue will be raised. Secretary of State Thompson, under whom the state motor department is operated, believes that registration fees for motor cars are high enough and he states he will oppose any action to increase them.

PUTS CURB ON TOWNS

The Massachusetts highway commission is showing a disposition to check the plans of town officials who believe they can put restrictions on drivers of motor cars and in recent decisions it has overruled the town officers. In Milton, where certain streets were petitioned to be closed, the commission refused to grant the requests for all the thoroughfares named, particularly with reference to roads that were connecting ones on through lines. Danvers was the next to run up against the rock of sensibility erected by the commission, which is striving to keep the speed limits uniform throughout the state. The selectmen of Danvers passed regulations limiting the speed of cars on three streets. This vote had to be submitted to the commission for

approval before becoming effective. It was rejected with the following comment:

"It seems to the board that the state law just enacted, regulating the speed of motor vehicles on all roads in the commonwealth, should be given a fair and reasonable trial. The law provides for a speed of 8 miles an hour around corners, curves, and at street intersections. This limit of speed is applicable upon all of the roads in question wherever there is any corner or curve; in other words, where there is any danger. The straight places on the road are likewise included in the state law referred to, which is applicable to all the ways in the commonwealth. It is the feeling of the commission that, until the new law relating to motor vehicles has been thoroughly tried out, and it has been shown that there is need of special speed regulations in certain places, the commission should be very slow to approve any regulations."

JUDGE BROAD-MINDED

Judge Burpee, of the superior court of Connecticut, hardly agreed with State Prosecuting Attorney Aleorn in committing a motorist to jail at Hartford, Conn., who had struck a pedestrian. John A. Smith, a chauffeur, was before the court for violation of the motor car law. He is in the employ of a New York lawyer. The pedestrian in question was a boy pushing a wheelbarrow and who became confused. The car was stopped as soon as the youngster was struck and the owner took him to a hospital and defrayed all expenses. Prosecuting Attorney Aleorn, who is credited with being the originator of the limited horsepower joker in the recent legislature, told Judge Burpee that it was time motorists were committed to jail. Judge Burpee, however, remarked that he hardly thought he would be justified in committing Smith to jail, for he had a good record and this was his first offense. He imposed a fine of \$100 and costs. Benjamin Zimmerman was tried on the same charge and was fined \$50 and costs. He had been fined \$100 and costs in the town court of East Hartford, but the higher court saw fit to impose only half as much upon him.

SETTLES REGISTRATION POINT

In reply to a query from Secretary of State M. H. Rogers, of Connecticut, regarding registration, Attorney General M. H. Holcomb has handed down the opinion that the owner of a registered motor vehicle on purchasing a new car has only to pay for the difference in horsepower between the old and new cars, and not compelled to pay for a complete new license.

DRY-DISK CLUTCHES GET ATTENTION

WHEN disk clutches were first introduced they were of the dry variety with a very limited number of disk members and the power that could be transmitted was relatively slight, due to the low coefficient of friction of metal on metal as then used. The next attempt was in the use of a limited number of disks, and leather or fiber was employed for the purpose of increasing the coefficient of friction, it having been learned that leather in cone clutches served very well indeed. Unfortunately the conditions were not the same in disks as prevailed in leather-faced cone clutches, and the leather failed to perform in a satisfactory manner; fiber, too, fell short of the requirement, and the disk idea was abandoned in America for a considerable time, excepting for a few runabout types of cars in which light weight and limited power permitted of the use of the disk idea, using three members, and leather was a favorite facing under these conditions.

In the course of time certain designers, feeling that they wanted something different from the conventional leather-faced cone type of clutch, hit upon the idea of using as many as fifty disks, and submerging them in oil, hoping thereby to realize all the good qualities and none of the bad.

The leather-faced cone clutch is still being used; it is a little more perfect than formerly; cork inserts are frequently employed in conjunction with the leather to render the clutch more certain in its action and to prevent slipping when oil gets on the faces or fierce when the leather becomes dry.

In the dry-disk clutch the main differ-

ence lies in the use of but a few disks, rather than thirty, forty or fifty disks, as might be the requirement when metal-to-metal are submerged in oil. Instead of metal-to-metal, in the dry-disk form of clutch, Raybestos or some other form of asbestos fabric is riveted to the alternate members, and this fabric, having a high coefficient of friction, reduces the requirement of disks down to possibly five members, two of which are faced with fabric and the balance are plain steel disks.

The Packard 18-horsepower model for 1910, with a motor having a bore of $4\frac{1}{16}$ and a stroke of $5\frac{1}{8}$ inches, is fitted with a dry-disk clutch having two Raybestos and three steel disks, making five in all. The 30-horsepower model of the same make for 1910 has a seven dry-disk clutch, three of the disks being Raybestos and the balance of steel. The Packard 30-horsepower motor has a bore of 5 and a stroke of $5\frac{1}{2}$ inches.

The disks are about the same size as those used in regular multiple-disk work and the results attained must be entirely attributed to the better coefficient of friction plus ability to withstand the heat generated. There seems to be little or no trouble attached to realizing a coefficient of friction of at least .25 under working conditions, when these products of asbestos are used, and it has long been known that cork inserts will allow of the use of dry plates with a limited number of disks, under proper conditions of design.

In view of the considerable use of asbestos products for brake linings, and the growing use of the same materials in dry-disk clutches, it is believed that some information bearing upon the strength of the material and its heat-resisting qualities will be of more than passing interest. Fig. 1 shows three sizes of Raybestos which were subjected to a pull test in the testing room of the Pierce-Arrow Motor Car Co. with results as follows:

Thickness in inches	Width in inches	Ultimate strength in pounds
7.32	1 $\frac{1}{2}$	900
7.32	1 $\frac{1}{2}$	960
7.32	1 $\frac{1}{2}$	840
7.32	1 $\frac{1}{2}$	900

Approximate average ultimate strength, 2,743 pounds per square inch.

Thickness in inches	Width in inches	Ultimate strength in pounds
7.32	2	1,280
7.32	2	1,360
7.32	2	1,200
7.32	2	1,480

Approximate average ultimate strength, 2,876 pounds per square inch.

The test seemed to show a good average of materials and although it is difficult to ascertain the exact sectional area of a fabric such as this, even so, the results are a close approximation and adequate for the intended purpose. The ultimate strength must be such as to withstand the work to be done when the material is squeezed between two faces and subjected to relative moment. By riveting the

fabric to the shoes, spacing the rivets, say 3 inches pitch or even less, it is possible to see how the material would sustain as against the stresses set up even were it of far less ultimate strength than the test shows.

It is not in the strength of the material then that trouble will be found; but this is true of a variety of materials, as leather, fiber, etc. Heat seems to be the source of trouble with most materials, and it is claimed for asbestos fiber that it is not subject to this trouble. In order to ascertain to what extent this claim could be sustained, some of the material was placed in a muffle furnace, equipped with a pyrometer, and the temperature was raised to 1,110 degrees Fahrenheit, with the result shown in Fig. 2. The heat test was applied to the same specimens that were pulled to ascertain the ultimate strength of the fiber, and at this high temperature, all products as wood, cotton, hair, fiber, etc., would have been destroyed.

The fire test did not disclose any material in the specimens such as cotton, and it was a fair conclusion that the fabric was made of asbestos bound into good mechanical relation by means of copper wire, in mesh form. After the fabric came out of the fire test it seemed to be strong and all that was lost in the heating process was a little black paint or filling, so that the fiber came out of the fire test the color of asbestos, which is a near white. It is believed that the success of dry-disk clutches is entirely due to the ability of asbestos materials to stand the heat, coupled with the high coefficient of friction which is one of the properties of this material.

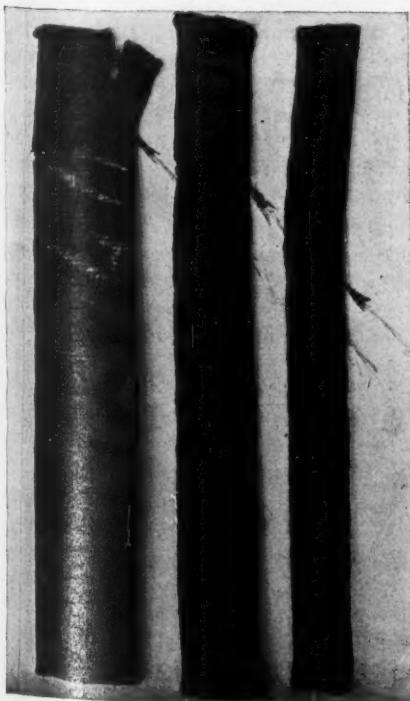


FIG. 1—RAYBESTOS TESTED

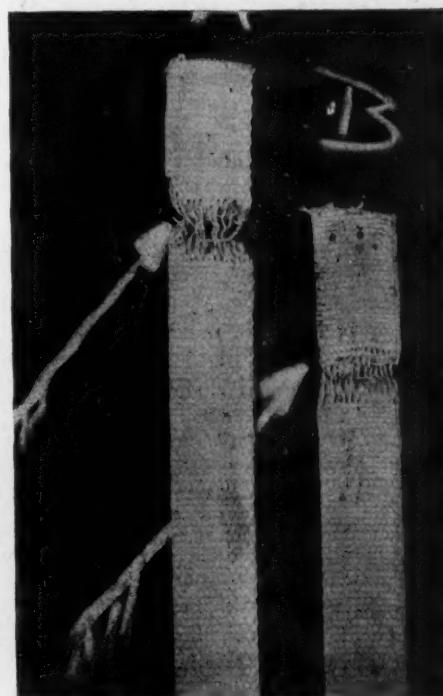
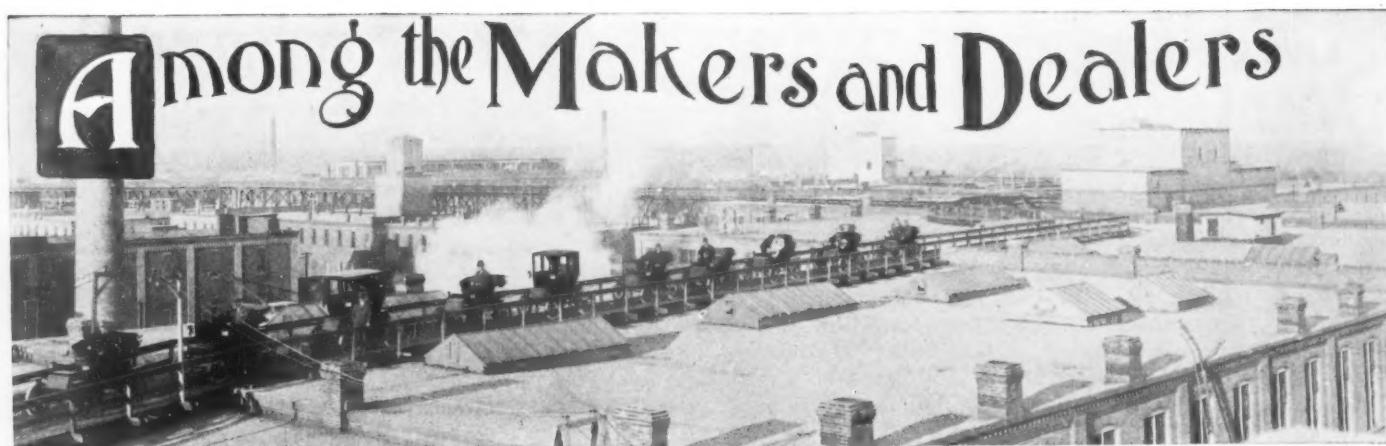


FIG. 2—FABRIC HEAT TESTED



STUDEBAKER MANAGERS ENJOY NOVEL RIDE OVER ROOF OF SOUTH BEND PLANT

In Garden Show—The Motor Cycle Manufacturers' Association will exhibit only in New York as a body at the garden show.

Railroad Buys Cars—The Oregon Railway and Navigation Co. has placed an order with the McKeen Motor Car Co., of Omaha, for two 55-foot, all-steel, 200-horsepower gasoline motor cars, making a total of four which will be used on its lines.

Goodwin Goes to Boston—Harvey Goodwin has been placed in charge of the New England branch of the Stromberg Motor Devices Co., 91 Church street, Boston, Mass., in the capacity of branch manager. Mr. Goodwin was formerly with the Austin Automobile Co.

Gets Bigger Building—The Philadelphia Studebaker branch has acquired the big building, 80 by 200 feet, at Eighteenth, Noble and Pennsylvania avenue, formerly occupied by the Railway Steel Spring Co., and will move from its present cramped quarters at 330 North Broad street, about October 1.

Garage for Sheboygan—A large new garage is being erected at Sheboygan, Wis., by W. A. Voigt, of Milwaukee, and A. G. Maurer, of Sheboygan. Only the shop will be completed this year, the remainder in 1910. The building will be 60 by 150 feet in dimensions, two stories high, with the shop of 50 by 60 feet dimensions.

Morgan Starting a Garage—J. H. Morgan, of Rhinelander, Wis., has purchased the Barnes block on Stevens street and next spring will have it ready for occupancy as a garage, livery and repair shop. Gordon Morgan, a son, will be manager. Accessories will form an important department of the business. The agency lines have not yet been closed.

Whitney Growing—The Whitney Mfg. Co., of Hartford, Conn., plans for an immediate addition to its present four-story structure in order to more fully care for the growing business. For some time past some of the departments have been running day and night. A temporary wood addition will be built to enable the company to keep pace with its orders during

the winter. In the spring a permanent concrete addition will be built. The addition is to have an area of 5,000 square feet of floor space.

Worcester Garage Sold—The interest in the Pilot garage at Worcester, Mass., owned by F. W. White, has been sold to Charles H. Bliss, who will carry on the garage business on the same line as at present.

Parker With P. & S.—George E. Parker has been appointed to manage the agency for the Palmer & Singer car recently established in Philadelphia. Options have been secured on a couple of locations, and a final selection will be made and announced during the coming week.

Schacht Gets More Room—The Schacht Mfg. Co. has acquired through purchase the buildings at 2727-2735 Spring Grove avenue, Cincinnati, Ohio. The property consists of two buildings 100 by 500 feet, each four stories in height, which will better enable this firm to double its output for 1910.

Bixby Joins Waverley—George L. Bixby, who has held the position of assistant superintendent with the Pope Motor Car Co., of Indianapolis, which is now known as the Waverley Mfg. Co., has entered the service of the Overland Automobile Co. as secretary to Will H. Brown, manager of the Indianapolis factories of the Overland Automobile Co.

Bearly Interested in Toledo—W. E. Bearly, for several years manager of the Standard garage at Youngstown, O., has purchased an interest in the Toledo branch of the Oldsmobile, and probably will make his home in Toledo. He will have the Oldsmobile agency for twenty counties in northwestern Ohio. He also will handle the Oakland.

Handling the Alco—The Longstreth Motor Car Co., former Maxwell representative in Philadelphia, has signed up to handle the Alco in addition to the Pullman. Pending the remodeling of large and handsome quarters at 257-259 North Broad street, the Longstreth concern is doing business temporarily at 1507 Race street, just around the corner. Fifty Alco taxicabs

are already in use on the streets of Philadelphia, and President W. C. Longstreth says the Quaker City Cab Co. has ordered 100 more.

Representing Oldsmobile—During the coming season the Oldsmobile will be represented in Indianapolis for the first time in 2 years. The car will be handled by the Buick Motor Car Co.'s branch in that city.

Is Continental Agent—The Continental Caoutchouc Co., of New York, announce a new agency for western Pennsylvania. The handling of Continental tires and demountable rims for this territory will be done by the Joseph Woodwell Co., 203 Wood street, Pittsburg, Pa.

Kent Company Starts—The Kent Motor Car Co., of Kenosha, Wis., has begun active business with the appointment of Milton A. Kent, until now assistant cashier of the Merchants' and Savings bank of Kenosha, as general manager. The company will handle several leading lines in Wisconsin and other northwestern states.

New Dakota Concern—E. K. Spoonheim, P. K. Spoonheim and A. C. Riddell have incorporated under the laws of North Dakota as the Spoonheim-Riddell Motor Sales Co. with a capital of \$20,000, with home offices at Northwood, N. D., and branches at Hatton, N. D., and Grand Forks, N. D. It handles the Halladay, Empire and Buick.

Buys Garage at Madison—A. O. Melaas has purchased the garage of the Roach-Leppo Auto Co. at Madison, Wis., and will handle the Maxwell exclusively. The members of the Roach-Leppo company are obliged to devote all of their time to the interests of the Kisselkar company, of Milwaukee, distributor for the Kissel in several middle western states.

Rents Ball Park Garage—The Studebaker Automobile Co. has leased from the Pittsburgh Baseball Club the garage under the bleachers of the new ball ground on Louisa street, Oakland. The rental is \$4,500 per year for the term of 5 years, and the building is 60 by 150 feet. Recently the E. J. Thompson Co. located on the opposite side of Louisa street and it is

predicted that this will be the new motor center of Pittsburg, as eighteen car lines pass this point. E. A. Williams will be manager of this agency.

Again Doubles Capacity—The K-W Ignition Co., of Cleveland, has again doubled its floor space and is preparing to manufacture magnetos and coils in a much larger quantity next season.

Salter Enters Trade—W. F. Salter, formerly of Cottonwood Falls, Kan., has purchased a tract of land in Centropolis, a suburb of Kansas City, and will erect a factory for building motor cars. Ground has been broken for the works. Salter will manufacture a 30-horsepower car bearing his name.

Will Make Motor Buggies—Announcement is made by the International Harvester Co. that the plant formerly operated by the Buckeye Mower and Reaper Co., at Akron, O., will be turned into a factory for motor buggies and it is expected to turn out at least 30,000 during the season of 1910.

Big Muffler Plant—The Cargil Mfg. Co., of Utica, N. Y., manufacturer of mufflers, has moved into its new plant, where its manufacturing facilities will be greatly increased. The new plant is a large three-story brick building formerly occupied by the Eureka Mower Works, at 34-38 Broadway. The company will have a capacity of over 200,000 mufflers a year.

Lozier Is Placed—Brown, Thomson & Co., of Hartford, Conn., have taken the agency for the Lozier, this being the first time that car has ever been represented in Hartford. The Lozier with this firm practically takes the place left vacant by the Packard, which the firm handled for a number of years. The Stevens-Duryea and the Cadillacs will continue to be sold.

Change in Osburn Company—The Osburn Foundry Co., of Detroit, is about to be discontinued and in lieu thereof the Osburn Electric Co. has been organized, the new company being upon a broader plan, a large capitalization and with better facilities. The address of the new company remains the same as that of the old. The assets of the old company have been in-

cluded in the increased assets of the new one and the liabilities of the old company have been assumed and will be paid in the regular course by the new organization.

Will Handle the White—The Wood-Kessler Auto Co., recently organized at Toledo, has taken over the local agency of the White steamer, which for some time has been in charge of S. C. Fisk. Mr. Fisk will join the Cleveland force of the same concern as a member of the Ohio sales department.

Plant at Greensburg, Ind.—A plant for the manufacture of motor cars will be established at Greensburg, Ind. A company is now being organized by Harry Hamilton, senior member of the Hamilton Garage Co. It is understood two four-cylinder gasoline models, including a runabout and touring car, will be manufactured and placed on the market during the coming season.

Buffalo's Garage Law—A new ordinance relating to garages is being prepared in Buffalo. It provides for the erection of a garage in practically any part of the city in which not more than 50 per cent of the buildings are residences; that is a garage may be built in a section of the city where there is less than 50 per cent of dwelling houses within a radius of 500 feet of the garage.

Regulating Fuel Storage—An ordinance providing that storage houses for gasoline and other explosives of that character in Columbus, O., shall not be within 25 feet of another building, has been amended to double the distance. The ordinance has been given its second reading by the Columbus city council and will likely be enacted. This will regulate the storage of gasoline about garages.

Prospects in Worcester—The selling season for 1910 is now on in Worcester, Mass. J. S. Harrington, agent for the Hudson and the Stevens-Duryea, reports he has twenty-five orders for the Hudson for fall delivery. Arthur Nichols, agent for the Pope-Hartford, has received the first 1910 model from the factory for delivery and expects several others in a couple of weeks. The Franklin Square Garage Co.,

agent for the Knox, reports a good list of orders for next year's models, while Murch & Hidden, representatives for the Cadillac, have a list of orders for the 1910 models that is equal to the others.

Selden Plans Addition—The Selden Motor Vehicle Co. has applied for a permit to build a factory building in Rochester, N. Y., at a cost of \$43,000. The building will be of brick and will be very extensive.

Fire in Seattle Garage—Twenty-one cars stored at 1240 Broadway, Seattle, in the F. A. Bennett garage caught fire the night of August 24 and all of the machines were more or less burned and damaged, including several sight-seeing cars.

Pell Goes to Oswego—David W. Pell, formerly superintendent of the Electric Vehicle Co., of Hartford, Conn., has been made general manager of the recently organized Pell Motor Car Co., of Oswego, N. Y. A plant for the new concern is now in process of construction. A moderate-priced car along original lines will be the product of the company. It is well backed financially.

Clark Company Formed—On September 18 the Clark Motor Car Co., of Shelbyville, Ind., was incorporated with \$150,000 capital stock. The incorporators are John D. Clark, G. B. Slaymaker, Arthur Woodward, J. H. Akers, John W. Lovett, S. P. McCrea and A. J. Thurston. The new company takes over the business and property of the Clark Motor Co., of Anderson. The company will have its first cars out by November 15. The new company will make 1,000 cars.

Building Big Garage—The Denver Omnibus and Cab Co., of Denver, Colo., has received a permit for the erection of a \$200,000 building to occupy half a block between Pearl and Washington streets on Eighteenth avenue. The structure will be fireproof, of steel and concrete, and will consist of two stories and a basement. The intention of the company is to centralize its business at this building. It will contain the offices of the company, a garage for the motor cars and a stable for all the horses, and a blacksmith, machine and car-



PLANT OF THE SPEEDWELL COMPANY AT DAYTON, O., WHICH HAS BEEN ADDED TO RECENTLY



WHERE PACKARD COMMERCIAL TRUCKS WILL BE MADE

penter shops, where all the repairing, as well as some of the manufacturing will be done. The company will employ about 300 men.

Making Ambulance Motor Cars—The Metropolitan Automobile Works, 2971 State street, Chicago, has been started to manufacture and assemble motor cars for ambulance, hearse and general undertaking purposes.

Vale Company Organized—Articles of incorporation have been filed by the Vale Automobile Co., of Beloit, Wis. The capital stock is \$10,000 and the incorporators are Harry Vale, J. D. Menhall and T. D. Woolsey.

Maxwell's Omaha Branch—The Maxwell company has opened a branch in Omaha at 312 South Eighteenth street, which is known as the Maxwell-Briscoe Omaha Co. The present quarters are only temporary, as the company is having a new two-story and basement brick garage constructed on Farnam street. The Omaha branch is in charge of Louis E. Doty.

Secure Kline-Kar Agency—Frink & Co., well-known wagon and harness manufacturers of 203 North Broad street, Philadelphia, have installed a branch of the B. C. K. Motor Car Co., of York Pa., in their establishment. That concern builds the Kline-Kar, and Frink & Co., after a thorough overhauling of their building, will push the sale of that car in the Quaker City.

Addition to Speedwell Plant—The Speedwell Motor Car Co. add another saw-tooth factory building to its already large plant. This building of steel and brick with cement floor will be occupied by the upholstering and painting departments which have been sorely cramped for room. Another building equal in size to this is contracted for and will be erected at once.

Bumper Injunction Granted—The Turner Brass Works, Sycamore, Ill., has secured an injunction against the Vanguard Mfg. Co., of Joliet, Ill., prohibiting the latter concern from "directly or indirectly making, constructing, using, or vending to others to be used, motor car bumpers containing or embodying the invention described in letters patent of the United States No. 873,544, issued December 10, 1907, to Ray W. Harroun, for motor car

bumpers." This injunction is dated Chicago, August 16, 1909, by the circuit court of the United States, northern district of Illinois, eastern division.

Berkshire May Move—Several attempts have been made to remove the plant of the Berkshire Motor Car Co. from Pittsfield, Mass., to Hartford, Conn. Last week a prominent official of the Berkshire concern inspected the tube mills at Hartford which have been acquired by the Pope company. It may be said authoritatively though that there is no immediate prospect of the Massachusetts company removing to Hartford.

Bringham Buys a Business—M. S. Bringham has purchased the interest of H. C. Fenn in the Bringham-Fenn Motor Car Co., of Seattle, and is now the sole owner. A new company has been incorporated and is known as the M. S. Bringham Motor Car Co., which will continue to occupy the same garage and salesroom at 915 East Pike, and will handle as heretofore the Cadillac. J. B. Farr, of Detroit, will be associated with Mr. Bringham.

Reo Prosperity—That prosperity is evident with the Reo Motor Car Co. and that this factory believes in sharing with its employes the fruits of toil, thrift and advanced methods of motor car building is shown in its second wage dividend. This company recently distributed \$10,000 among such of its employes who have been with the concern 1 year or more. A check for an amount equaling 5 per cent of each employe's wages for the entire year was included in the last week's pay envelope.

Rushmore Expanding—The Rushmore Dynamo Works have just extended their capacity by the erection of a large fireproof storehouse, and will soon break ground for a two-story fireproof concrete extension to their machine shop, 50 by 200 feet, giving them 20,000 square feet of additional floor space. The two present producer gas engines, aggregating over 200 horsepower, have proved insufficient for the demands of the factory, even when supplemented by a booster gasoline engine and a new 100-horsepower compound steam engine and a third gas engine of 125-horsepower is shortly to be installed. A new lens silvering department also has been added, thereby enabling the lenses to be made complete from the rough disks. The London branch, at 49 Shaftesbury ave-

nue, has just opened two new sales offices, one at 33 Victoria Buildings, Deansgate, Manchester, England, and the other at 1 Crow street, Dublin Ireland.

Handling the Moline—The Milwaukee agency for the Moline has been established at 803 Grand avenue in quarters formerly occupied by the White and Ford. The Wordingham Auto Supply Co. and Moline agency occupy the building.

Locates in Butler—The Butler Automobile Supply and Repair Co. has opened a large garage and machine shop on South Main street, Butler, Pa., under the management of A. A. Haley. The company will have two agencies and will carry a line of accessories.

Takes the Elmore—The Elmore agency in Denver has been placed with the Arapahoe Motor Co., now located at 1943 Arapahoe street. A salesroom on Broadway will be secured to display the Elmore, while the Arapahoe street building will be continued as a repair shop.

Sibley Company Organized—The Sibley Motor Car Co. has been organized and incorporated under Michigan laws to manufacture a popular-priced touring car and roadster. Plans are being carefully developed for a quantity production early next year. The incorporators are Frederick M. Sibley, Henry Wineman, Jr., John G. Utz and John B. Phillipps. Mr. Utz and Mr. Phillipps were formerly associated with the Chalmers-Detroit Motor Co. as chief engineer and superintendent respectively.

Studebaker Convention—Twenty-four Studebaker branch managers spent the past week in their annual convention at South Bend. While the week was taken up with purely business matters, there was a pervading spirit of elation over the fact that during the past year Studebaker motor car business has increased in volume from \$2,000,000 to over \$40,000,000. Among other incidents of the week was a tour of inspection in Studebaker electric cars through the mammoth carriage and wagon factory at South Bend. This plant covers an area of about 2 miles square. The buildings are mostly four and five stories high. The tour of inspection of each floor and over the system of tramways which run over the roofs and connect the various buildings, covered a distance of a little more than 24 miles. Obviously such a trip could not be made even in a day on foot. By the use of electric vehicles, however, using the big elevators to ascend from one floor to another and then driving through the entire labyrinth of aisles on each floor, ascending to the next, and finally to the roof, the trip was made in one afternoon with plenty of stops for careful inspection of methods and models. From South Bend the party of branch managers and members of the executive board made a trip by special car to Detroit, where the plants in which are manufactured the Studebaker-E-M-F and Flanders cars are located; then on to Ely-

ria, O., where the Garford factory, which manufactures Studebaker-Garford, also was carefully inspected.

Francis Joins Packard—Charles A. Francis, formerly superintendent of the carriage department of the Studebaker Brothers Mfg. Co., has accepted a position with the Packard Motor Co., Detroit, Mich.

Addition Is Finished—The large fire-proof addition to the garage of F. E. Avery on Franklin avenue, Columbus, O., is now completed and occupied. The addition will more than double the space of the concern which consists of the Packard and Waverley electric agency. The addition contains the offices, show rooms and repair shop. The second floor of the old portion will be torn down and reconstructed after fireproof plans.

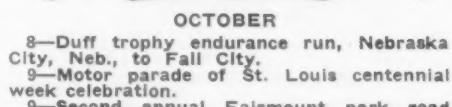
Starts in Denver—The Pioneer Motor Car Co., of Denver, organized last month, has completed the erection of a large garage at 1020 Colfax avenue, in the heart of the Capitol Hill residence district. The company will handle the Patterson and Whiting pleasure cars and the Grabowsky trucks. The officers of the company are: President, Sherman B. Canott; vice-president, Orra E. Byron; secretary and treasurer, Robert B. Rinehart.

Big Garage for Worcester—What will be the largest garage in Worcester, Mass., and one of the largest in New England, will soon be erected by the Norcross Automobile Co., agent for the Buick and Oldsmobile, which has purchased 7,181 feet of land bordering on Commercial, Exchange and Cypress streets. The building will be two stories high and will measure 60 by 100 feet. It will be fireproof and the only two-story garage in this vicinity.

Fire in Milwaukee Garage—A new Overland touring car, two second-hand Mitchell runabouts, a Mitchell touring car, also second-hand, and a Reliable-Dayton were totally destroyed by fire in the repair shop of the G. W. Browne Motor Co., 228-232 Wisconsin street, Milwaukee, Wis., on Sunday evening. The total loss to the Browne concern will be \$10,000. The office and demonstrating rooms were damaged by water. Worn insulation on an extension light used by a machinist in repairing a car caused the ignition of a can of gasoline. Six new cars were rescued before the flames had spread.

San Francisco Show Outlook—Arrangements for the third annual San Francisco show are progressing rapidly, and when the exhibition opens in the Emporium on Saturday evening, October 16, there promise to be a greater number of cars on the floor than have appeared at either of the previous shows. More than a score of active dealers have already taken space, and a large number of different cars and variety of models will be displayed. One of the features of the show will be the exhibition of several makes of electric machines. The electric never has won a great deal of popularity in northern California,

Coming Motor Events



OCTOBER

- 8—Duff trophy endurance run, Nebraska City, Neb., to Fall City.
- 9—Motor parade of St. Louis centennial week celebration.
- 9—Second annual Fairmount park road race, Philadelphia.
- 8-9—Reliability run of Louisville Automobile Club, Louisville, Ky.
- 8-9—Track races at Sedalia, Mo.
- 19-22—1,000-mile reliability run of Chicago Motor Club.
- 16-21—Show at state fair, Dallas, Tex.
- 23—Road races of Automobile Club of California, San Francisco.
- 27-29—Track meet at Vicksburg, Miss.
- 28-30—3-day track meet at Dallas, Tex.
- 30—Vanderbilt cup race.

NOVEMBER

- 3-13—Outdoor show at Salt Lake City, Utah.
- 6-13—National show at Atlanta, Ga.
- 9—Opening meet at Atlanta speedway.
- 22—Start of flag-to-flag reliability, Denver to City of Mexico.

DECEMBER

- 28-29—Philadelphia mid-winter reliability run.
- 31—Opening of Grand Central palace show, New York.

JANUARY

- 7—Closing of Grand Central palace show, New York.
- 8-15—Madison Square garden show, New York.
- 17-24—Philadelphia show.

FEBRUARY

- 5-12—N. A. A. M. show, Chicago Coliseum.

MARCH

- 5-12—Boston show.

although efforts have been made by a few of the dealers to demonstrate its remarkable utility for shopping and for the use of women in the country districts.

American Simplex Election—At the annual meeting of stockholders of the Simplex Motor Car Co., of Mishawaka, Ind., held in that city Monday, two-thirds of the stock was represented and twenty-five stockholders were present. The following directors were elected: D. A. Shaw, E. J. Gulick, Mishawaka; E. M. Hovey, Detroit, Mich.; J. T. Knorr, LaMars, Ia., and George Grant, Detroit, Mich. The following officers were then elected for the ensuing year: T. C. Starrett, Detroit, Mich., president; R. E. Kamm, Mishawaka, vice-president; E. J. Gulick, Mishawaka, secretary and general manager; D. A. Shaw,

Mishawaka, treasurer. The company is in a flourishing condition. It is now constructing a large addition to its plant.

Makes a Hard Climb—At Los Angeles recently F. R. Pendleton drove a friction-drive Cartercar delivery car up the famous Angel's Flight grade, the street car company stopping its cars while he turned the trick.

Opens in Worcester—The Worcester Motor Car Co., of Worcester, Mass., has been incorporated under the Massachusetts state laws with a capital of \$5,000 for the purpose of selling and repairing motor cars. Frank B. Williams is president and treasurer and F. Thompson is clerk, while George S. Hamel is secretary.

Laporte Venture Announced—The formation of a partnership of G. H. Grieger, of Hanna, and A. F. Smutzer, of Laporte, in a motor car venture in Laporte, Ind., has just been announced. Preparations for a large garage to be opened in a short time in Laporte are now under way. Mr. Smutzer had the agency for the National and Overland.

Working Overtime—The Laporte Carriage Co., of Laporte, Ind., has commenced working its entire force 11 hours a day, and from present indications the company will be able to run on this schedule for some time to come. The great business in the manufacture of car bodies which this company is doing is responsible for the increased activity at the plant.

Savannah Activity—During the past week many new agencies have been taken on in Savannah, Ga. Along with this a new garage is being built for the Maxwell Automobile Co., which will move shortly from its old stand on Broughton west to the new quarters on Broughton east. The garage of the Savannah Taxicab Co. has just been completed at a cost of \$30,000. It has taken on the agency for the Crawford, DeTamble and Carter car. Edward F. Moyle has taken on the agency for the Overland and now has quarters at 10 Broughton east. The Bryson Automobile Co. has taken on the agency for the Hudson to supply the state of Georgia.



CARTERCAR DEMONSTRATES ITS HILL-CLIMBING ABILITIES IN CLEVER MANNER



The Motor Car Repair Shop



OME time ago, an owner, who was driving his own car, noticed the development of an irregular miss-fire whenever his car approached a speed of about 15 miles an hour, and the greater the speed the greater the tendency to miss. Being unable to locate the trouble, he turned the car over to a repairman. The repairman, after removing the cover of the commutator and running his finger around the inner surface, advised the owner to have the commutator fixed or replaced. The owner acquiesced and asked when the job might be accomplished. He did not know just what was the matter with his car; neither did he suggest what repairs were necessary; nor did he have to have the car again at such and such a time. The result was that having shown some confidence in the repairman's ability to locate trouble; respect for his judgment as to the practical repairs necessary, and a disposition to be reasonable in regard to the time necessary to do the work properly, the answer to that owner's question was to the effect that, if he cared to wait he might have the car in less than 15 minutes. He waited. The old commutator was removed in 4 minutes; the new commutator was replaced in 5 minutes; then after carefully oiling the new commutator and its moving connections, and giving the motor a general inspection, tightening a nut here, and applying a few drops of oil there, the motor was started, speeded up once or twice to see if the new device was doing its duty; the hood was carefully let down and fastened, and the motorist departed, content with the performance of his motor, and ready to recommend the repairman to any friend who anticipated repairs on his car.

When the old commutator was removed and cleaned it was seen that a depression A Fig. 2 had been worn into the surface of the fiber, on which the roller R of the revolving segment traveled, just in front of each stationary metal segment C. The result of this condition was that whenever high speed was attempted the roller on striking the farther edge of the depression, would tend to jump the greater part of the contact as designated by the course of the dotted lines B, thereby causing a weak spark or no spark at all in the respective cylinder. Generally when a commutator has been in service long enough to become worn as above described, the roller and pin of the revolving segment also will be found in bad shape. To repair a timer in this condition, it is necessary to center the body portion in a lathe and true up the surface on which the roller travels by taking off one or two fine cuts. If the segments C are case-hardened

Hints to the Amateur

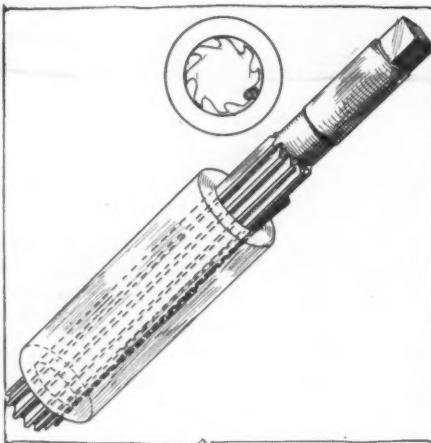


FIG. 1

as in some commutators, the surface will have to be ground true, or if there be no facilities for grinding at hand, the segments will have to be removed and annealed, then carefully cleaned up and replaced and the cut or two taken off in a lathe. From this it may be seen that to repair a commutator in the above manner requires a number of operations by a skilled workman and a considerable amount of time; and under these conditions a replacement is generally most practical.

ABOUT REAMING AND TAPPING

It is often found, in fitting bushings and parts, and in operations of that kind where reamers are extensively used, that the reamer is under size or just a trifle too small to secure a proper fit without dressing down the male portion of the joint. In such cases much time may be saved and a better fit obtained in the following manner: Roll up a small sheet of brass so it will fit between two of the cutting edges of the reamer as shown in Fig. 1; then ream out the hole carefully with the roll of brass in place. It will be found

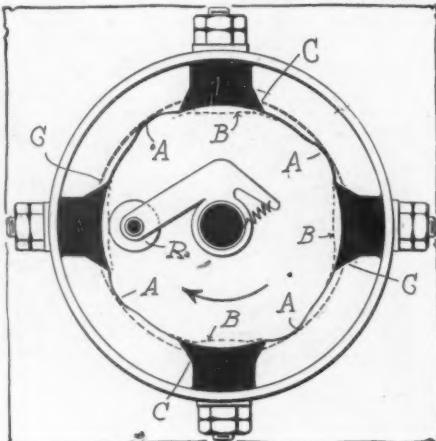


FIG. 2

that if the roll of brass is of the proper size it will force the reamer into a position just a trifle eccentric to the center of the bore, bringing the cutting edges on the opposite side of the reamer into action. Very fine cuts should be taken in this manner and the roll of brass should be placed between different teeth each time that the reamer is removed. This same hint is applicable to taps and dies. If there is no sheet brass at hand a piece of paper or something else of the kind may be used. Never use a reamer to ream out pipe of any kind. The scale inside of pipe caused by the flux used in welding or brazing is as hard as glass, and no reamer can be made hard enough to cut it.

HINTS ON BRAZING

Brazing is the soldering together of iron, copper, brass, etc., with an alloy of brass and zinc, called spelter solder. The metals to be joined may be iron, pure nickel, brass, german silver or gun-metal; but in any case it must be carefully cleaned, and when the parts are fitted, binding with soft iron wire will often be necessary, to hold the parts firmly together during the process. Borax must now be applied; this may be done by wetting the joint with a stick which has been dipped in water and sprinkling the powdered borax on so that it will adhere to the wet portion, or it may be mixed with water and painted on with a brush; and if possible a little flux should be worked into the prospective joints before the parts are put together. The solder, in the form of wire or strip, may often be bound round the joint at this stage, but is generally applied afterwards and as the heat is raised. As a general rule a bed of charcoal is the best resting surface for the work which is to be brazed, and a gas blowpipe of suitable size the best means of heating, but a small forge of the ordinary pattern will often serve the purpose. A pointed iron wire bent at right angles a little less than $\frac{1}{4}$ of an inch from the end and amalgamated at the end with the solder to be used is often of great service in directing the flow of the solder, and another wire cleft at the end by a long saw-cut and slightly opened out into Y-shape is of value in placing small pieces of solder where required. When the metal to be soldered is a good deal less fusible than the solder it is generally desirable to thoroughly heat the work first and then apply the solder, so as not to vaporize or burn away any of the zinc. Shredded or carded asbestos, moistened with weak gum-water, made into a cake and dried, is an excellent non-conducting and radiating support for work, and may be also shaped into jackets, troughs, or heat-saving pieces for special work.



Development Briefs

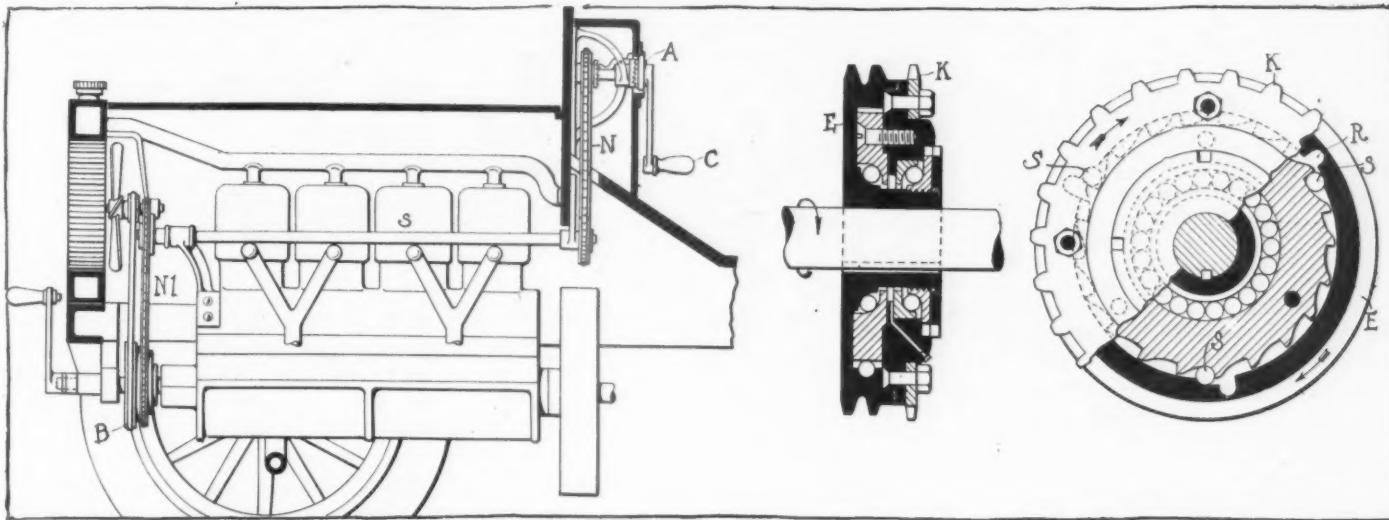


FIG. 1—S. & W. MOTOR CRANK

FIG. 2—AUTOMATIC CLUTCH ON CRANKSHAFT

S. & W. MOTOR CRANK

STRYKER & WOESSNER, Huron, O., are manufacturing a special device whereby motor cars can be cranked from the seat of the car. This cranking scheme is diagrammatically illustrated in Fig. 1, in which C shows the crank attached to the rear of the dash. From this crank the turning motion is imparted to the flywheel through a drive chain N, a shaft S passing alongside of the motor, and another chain N1 which transmits from the forward end of this shaft to a sprocket on the crank-shaft. As far as the device is shown in this illustration it is a very simple one, but there are two features in conjunction with it which deserve attention: The first is a device at A to prevent any possible back kick from the motor being communicated to the starting crank C and the second is an automatic clutch at B whereby the motor runs ahead of the driving chain N1 as soon as ignition occurs. Fig. 3 shows the arrangement at A. Should a back kick occur it immediately starts the sprocket H traveling in the opposite direction, and when this happens the teeth H1 engage the catch L, carrying it downward in the direction of the arrow which immediately forces the bracket L1 to the left and causes the starting crank C to disengage at the point Z, so that the back kick is not in any wise transferred to the crank C. The method of automatically releasing the cranking mechanism from the crankshaft at the point B, Fig. 1, is explained in Fig. 2. The sprocket K is for the chain N1 and this sprocket is separated from the pulley E which is keyed to the crankshaft. When the starting crank is worked the sprocket K as well as the pulley E are carried in the direction indicated by the arrows. The transfer of power from the sprocket K being through the four rolls S which form

clutching mediums to transmit the rotation of the sprocket to the pulley E. As soon, however, as the motor starts of its own accord the speed of the pulley is greatly in advance of that of the sprocket K and it starts running away from it, at which time and rolls S, by centrifugal force, are thrown into the receptacles R of the pulley E, where they remain until the motor stops. When it stops they again find their way into the position as

illustrated. Fig. 4 illustrates separately the pulley E, the four receptacles R for the locking rolls, and two of the rolls S in place, as well as the sprocket K with its serrated face for engaging of the rolls.

MANUFACTURER'S BRIEFS

The Marey Tool Works, Putnam, Conn., is marketing a simple little tool to remove cotter pins. It is like the letter Z, except that the sloping intermediate part uniting the opposite ends of the two horizontal is much longer and is at right angle to the horizontal. The horizontals are wedge-shaped so that they can be inserted in the round end of the cotter pin to pull it, or can be used to spread the split end of the pin after it is inserted.

The Auto-Tire & Re-enforcement Co., Auburn, Ind., manufactures a re-enforcement for tires which is placed inside of the casing. The re-enforcement consists of three or four plies of tire fabric heavily frictioned with rubber and vulcanized in shape to conform with the inside of a tire casing. The re-enforcement covers the whole inside of the casing extending down to the point of the bead. It is placed in the casing without application of heat and is claimed, because of especial vulcanizing process, to conform to the shape of the tire.

The Buffalo General Mfg. Co., Buffalo, N. Y., manufactures Koen's folding chairs for use in the tonneau of cars. These chairs fasten to the floor or sides of the tonneau, and when folded up rest against the side wall of the bodies. The chairs are of four types: No. 1, which fastens to the door pillar or side of the car; No. 2, which is supported on an upright attached to the car floor; No. 3, which can be shifted about at will on revolving seats without fastening, and No. 4, supported from the floor by a vertical support.

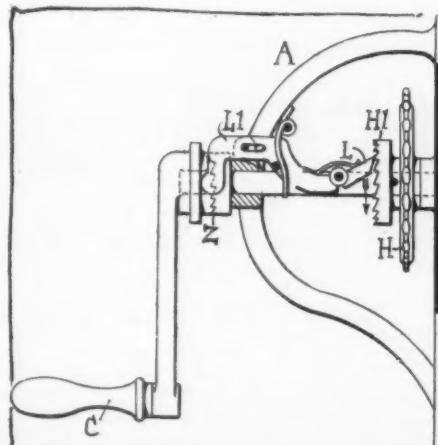


FIG. 3—HOW BACK-KICK IS PREVENTED

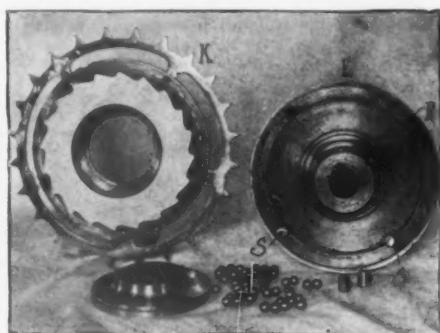


FIG. 4—SPROCKET AND CLUTCH CONSTRUCTION

Brief Business Announcements

Boston, Mass.—H. C. and D. C. Castle have secured the agency in New England for the Haynes.

Buffalo, N. Y.—John B. White, of Niagara Falls, is about to erect a new garage in Genessee street, near Spring.

Houston, Tex.—The Shelp Rubber and Supply Co. has opened headquarters on Main street, between Capitol and Texas avenues.

Utica, N. Y.—E. W. Dunn and A. J. Emerson have formed a partnership and will open a new garage and repair shop at 12-14 Burnett street.

Boston, Mass.—The new Charles gate garage, which is to be located at Massachusetts avenue and Newbury street, is to be ready for business by December 1.

Boston, Mass.—The Rainier Motor Car Co. of New England has just opened headquarters in the Motor Mart at 24 Pleasant street. George T. Gould is the manager of this concern.

Trenton, N. J.—William T. White has resigned his position with the Roebling company and in the future is to act as manager of the Mercer Automobile Co., in which the Roeblings are interested.

Oakland, Cal.—Tallman & Stephenson intend to establish headquarters at 310 Twelfth street within the next month. They are to act as agents for the Overland and Marion, as well as the California-built sunset car.

St. Paul, Minn.—The Cook Motor Sales Co. is the name of a new concern which is to represent the Reo and Premier. It has leased two floors in the new building which is being erected opposite the old Tom Johnson residence.

Boston, Mass.—The new Charlesgate garage at Massachusetts avenue and Newbury street is shortly to be opened for business. It is to be under the management of H. S. Merry, who is now located at 121 Massachusetts avenue.

Warren, O.—W. A. Williams and O. D. Morgan have purchased the old plant of the Reliance Machine Co. and are to go into the manufacturing of motor cars. In addition to manufacturing cars they are to act as agents for the Maxwell.

Connersville, Ind.—Articles of incorporation have been filed by the Connorsville Auto Supply Co. This company has a capital of \$4,000 and is to deal in cars and supplies. The incorporators are A. E. Gobie, A. Adams and R. Thornburg.

Burlington, Ia.—A change has been made in the local agency for the Chalmers-Detroit car. In the future the firm is to consist of John P. Sheagren, who is the present representative, and W. B. Hunt. In addition to handling the Chalmers-

Detroit, the new firm has secured the agency for the Hudson.

New York—The Midland Co. of New York, which has the agency in this city for the Midland, is now located at 1851 Broadway.

New York—The Poertner Motor Car Co. has decided to add the Empire to its list. This company will still continue to act as agent for the National.

Brooklyn, N. Y.—J. W. Mears, who is the agent for the Acme car is to remove on October 1 from his present quarters on Livingston street to 9 Ocean parkway.

Trenton, N. J.—The Gasoline Motor Efficiency Co., of Jersey City has been incorporated with a capital stock of \$75,000, by E. Leonard, Jr., F. A. Heath and H. C. Griffiths.

Kansas City, Mo.—The Remy Electric Co., of Anderson, Ind., has decided to open a branch in this city. E. F. Willett, formerly with the New York city offices of the company, is to act as manager.

Atlanta, Ga.—The new quarters for the firm of J. E. Levi & Co., agent for the Reo and Premier cars at 222-224 Peachtree street, are ready for occupancy and the company will take possession at once.

Bristol, Conn.—The Bristol Engineering Co. has accepted the proposal of the New Departure Co. to take over the business and assets of the Bristol company. The shareholders are to exchange their stock at par for an equal amount of the 7 per

RECENT INCORPORATIONS

White Plains, N. Y.—Tri-State Supply Co.; capital stock, \$200,000; to maintain a garage and deal in motor cars. Incorporators, W. G. Barrett, George Hart and F. A. Ryer.

Oswego, N. Y.—Bell Motor Car Co.; capital stock, \$150,000; to manufacture motor cars, parts, etc. Incorporators, C. C. Place, A. N. Radcliffe and D. W. Pell.

New York—Packard Renting Co., capital stock \$5,000; to deal in and rent motor cars. Incorporators, C. E. Bandman, Walter Frank and G. L. Griffith.

Buffalo, N. Y.—DeSchaum-Hornell Motor Co., capital stock \$150,000; to erect a plant at Hornell. Incorporators, W. A. DeSchaum, W. G. Paul, R. H. Lincoln and H. J. Hopkins.

Austin, Tex.—El Paso and Fort Hancock Railroad, capital stock \$100,000; to operate bus line between El Paso, Socorro, San Elizario, Clint, Fabens and other towns in El Paso county. Incorporators, R. Capier, C. E. Kelley, W. Cooley and others, of El Paso.

Newark, N. J.—Newark Auto and Engineering Co., capital stock \$25,000. Incorporators, Alexander Traudt, Sr., Alexander Traudt, Jr., and Jeanette Traudt.

Houston, Tex.—Palace Automobile Co., capital stock \$5,000. Incorporators, L. A. Pitts, R. P. Christian and J. F. Minton.

Indianapolis, Ind.—Reliable Garage, capital stock \$25,000; to deal in motor cars. Incorporators, J. A. George, O. F. Shaw and W. R. Wheeler.

cent preferred stock of the New Departure company.

Detroit, Mich.—A garage has been opened at 41-43 Washington boulevard and is to be known as the Washington Boulevard garage.

New York—The Croxton-Keeton Motor Co., of New York, has been incorporated with a capital stock of \$60,000. The incorporators are H. A. Croxton, J. P. Stoltz and W. D. Grand.

Brooklyn, N. Y.—In the future the A. W. Blanchard Co., Inc., of 342 Flatbush avenue, has decided to add the Oldsmobile car to its list. The company already represents the Waverley and Herreshoff machines.

New Orleans, La.—A new taxicab service is to be started in this city, to be known as Levand's Auto Livery. L. Levand is to be the manager of the new company, which will be located at Rampart and Bienville streets.

Indianapolis, Ind.—The Mosher Automobile Co., of Anderson, Ind., has been incorporated with a capital stock of \$6,000. It will engage in the making of cars. The incorporators are A. T. Mosher, J. E. Van Deventer and E. E. Young.

Houston, Tex.—In the future the National car is to be represented in this city by Clarence Martindale, and has established headquarters at 406 Scanlan building. His territory is to include Galveston, Beaumont and San Antonio, as well as this city.

New York—Peter Fogarty and George Post have secured the local agency for the Elmore, formerly held by A. Elliott, and have secured quarters on West Fifty-fourth street. The new company is to be known as the Elmore Motor Car Co. of New York.

Atlanta, Ga.—The agency for the Oldsmobile and Oakland cars are now settled in their new quarters at 132 Peachtree street. This is to be used as salesroom and showroom, but the garage is still to be located on Auburn avenue, the old home of the company.

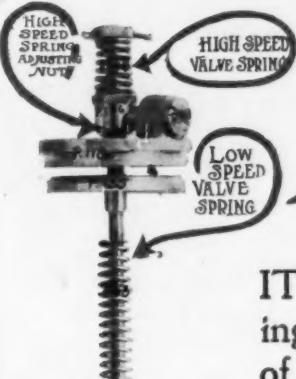
Trenton, N. J.—The General Motors Co. has just filed an amendment to its charter, increasing its capital stock from \$12,500,000 to \$60,000,000. The company has heretofore acted entirely as a holding company, but in the future its policy is to be one of expansion.

Trenton, N. J.—The Commercial Car Co., of Keyport, has been incorporated with a capital stock of \$125,000, and is to manufacture motor vehicles, motor boats, engines, locomotives, etc., The incorporators are G. F. Smith, P. and W. Cherry and C. Russell.

STROMBERG

THE BEST BECAUSE
IT GIVES THE BEST RESULTS

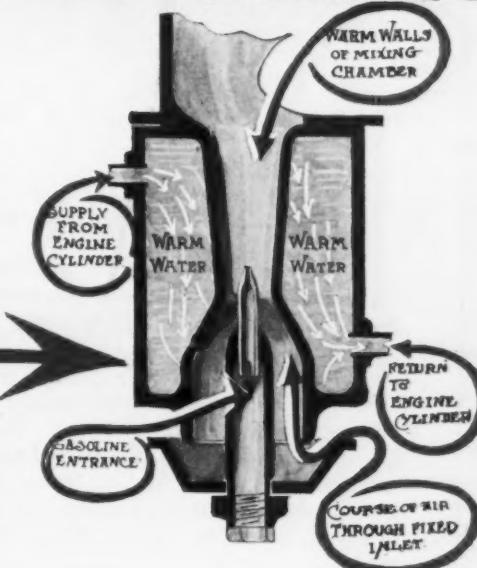
This Combination Gives A Perfect Mixture At All Engine Speeds



THIS INCREASES ITS EFFICIENCY by making it entirely independent of all climatic changes. No wintry blast can possibly effect the perfect volatilization of every particle of gasoline sucked



from the spraying nozzle. No globules of unvaporized gasoline however minute can withstand the heat of the STROMBERG water-jacketed mixing chamber and pass to the engine to carbonize its walls and reduce its power.



We tell you all about the STROMBERG in our Catalog No. 2, it gives illustrations and descriptions of every detail of construction.

STROMBERG MOTOR DEVICES COMPANY

Main Office and Factory

1253-5 Michigan Avenue, Chicago, Ill.



EASTERN—NEW YORK,
64th Street and Broadway

NEW ENGLAND—BOSTON,
Motor Mart, 91 Church St.

WESTERN—SAN FRANCISCO,
307 Golden Gate Avenue

BRANCHES

R. H. Combs, St. Louis, Mo.
Kansas City Auto. Sup. Co.,
Kansas City, Mo.
Alamo Automobile Co., San Antonio, Texas.
Chanlon & Lyon Motor Sup. Co., Seattle, Wash.
West Coast Supply Co., Portland, Ore.

The Von Hamm-Young Co., Ltd., Honolulu, T. H.
Chanlon & Lyon Motor Supply Co., San Francisco, Cal.
The Western Rubber & Supply Co., Los Angeles, Cal.
Auto Equipment Co., 1518 Broadway, Denver, Colo.
Coughlin & Davis, Cincinnati, Ohio.

DISTRIBUTORS

Stephenson Motor Car Co., Milwaukee, Wis.
Stoddard-Dayton Automobile Co., Minneapolis, Minn.
Way, Mitchell & Co., Cleveland, Ohio.
Bertachy Motor Co., Council Bluffs, Iowa.
Auto Equipment Co., Philadelphia, Pa.



Stevens-Duryea Motor Cars 1910



Model X Limousine, Seven Passenger, Four Cylinder, 24 Horse Power

Price \$3750

with standard equipment and finish

The body is one of the most recent achievements in aluminum body work, and the luxurious finish and appointments will class it as a masterpiece in design and comfort. The frame is built of specially seasoned timber, the panels of hand hammered sheet aluminum, windows of French bevel plate, framed in the best polished mahogany.

The extension over the driver's seat is carried well over the dash to which is attached the folding wind shield which can be extended forward or backward, allowing the driver to have clear view of the road and still be fully protected.

The window frames are fitted with patented locks and drop, with exception of rear window which is stationery.

The driver's seat is upholstered in hand buffed leather, plain finish. Locks for the doors are combined in the usual outside drop handles, also lever handles are fitted for convenience in opening from the inside of the car.

The interior options in trimming include imported Bedford cord, broadcloth or goatskin, having silk curtains, arm holders, lace and high pile carpet to match.

The tonneau is spacious enough to carry five, two adjustable auxiliary seats being provided which face forward. Detail of refinements include hat cords, coat and robe rail, pockets in doors, glove tray holding mirror, water and toilet bottles, flower vase, card tray, electric cigar lighter, umbrella holder, speaking tube to driver. A storage battery in connection with a three lamp dome globe furnishes ample light for the interior.

The finish of the body is in most exquisite taste and combined with the Model X chassis, which since its inception has been noted for its perfect spring suspension and power plant, harmoniously exemplifies a most modern limousine.

STEVENS-DURYEA COMPANY
Chicopee Falls, Massachusetts

Members A. L. A. M.



ROAD RACING RECORDS

FOREIGN RACES.

74.3 MILES PER HOUR—Made by Nazaro in Fiat in Florio cup race, Italy, September 6, 1908; distance, 328.2 miles.

71.8 MILES PER HOUR—Made by Trucco in de Dietrich in Florio cup race, Italy, September 6, 1908, distance 328.2 miles.

AMERICAN RACES.

69.9 MILES PER HOUR—Made by Chevrolet in a Buick in Riverhead sweepstakes, Long Island, September 29, 1909; distance, 113½ miles. Used Schebler Carburetor.

65.11 MILES PER HOUR—Made by Wagner in Fiat in American grand prix at Savannah, Ga., November 26, 1908; distance, 402 miles.

64.9 MILES PER HOUR—Made by Henry in Benz in American grand prix at Savannah, Ga., November 26, 1908; distance, 402 miles.

64.45 MILES PER HOUR—Made by Hanisch in Apperson in Santa Monica road race, Los Angeles, Cal., July 10, 1909; distance, 202 miles.

64.36 MILES PER HOUR—Made by Burman in Buick in Riverhead sweepstakes, Long Island, September 29, 1909; distance, 113½ miles. Used Schebler Carburetor.

64.6 MILES PER HOUR—Made by Robertson in Locomobile in Vanderbilt cup race, Long Island, October 24, 1908; distance, 288.6 miles.

64.25 MILES PER HOUR—Made by Lytle in Isotta in motor parkway sweepstakes, Long Island, October 10, 1908; distance, 284.6 miles.

64 MILES PER HOUR—Made by Lytle in Isotta in Vanderbilt cup race, Long Island, October 24, 1908; distance, 288.6 miles.

Schebler

America's

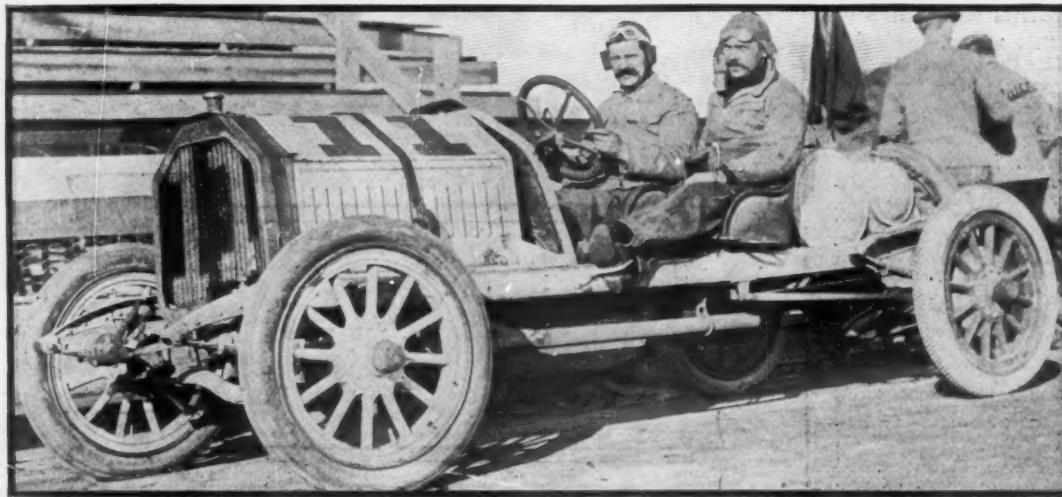
Fastest Carburetor

Breaks All Foreign and American Road Records in America



CHEBLER has won America's highest speed record and now is the undisputed speed champion of America. Louis Chevrolet driving a 4½ by 5 inch Buick car with Schebler carburetor in the 114 mile road race at Riverhead, Long Island N.Y. Wednesday, September 29, covered this distance in 97 minutes, 36.3 seconds or at 69.9 miles per hour. This is the fastest sustained flight ever made in America by either foreign or American cars, and has only been beaten twice in the world, and that by higher-powered European racing cars on boulevard courses in Europe. Never in America has such road speed been maintained throughout a whole race by any other American or foreign car of any horsepower. The Schebler is the speed carburetor of America.

Schebler—America's

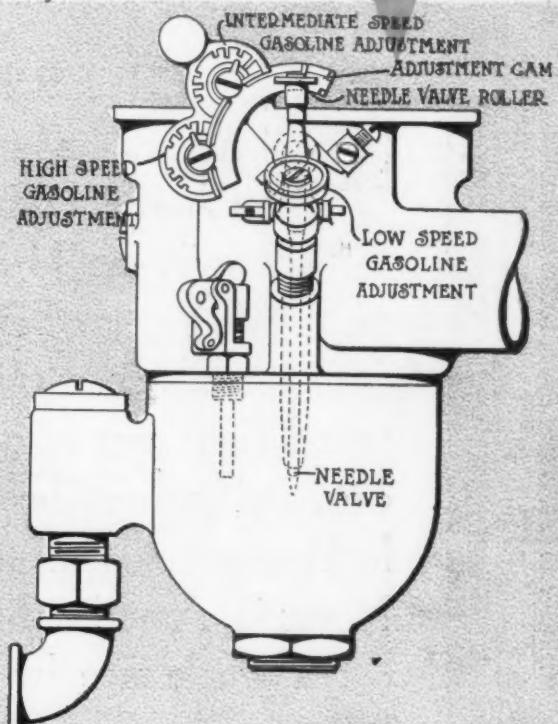


CHEVROLET IN BUICK WITH SCHEBLER CARBURETOR.

AS has been demonstrated in every road race this summer, the Schebler carburetor is the speed king of America. The unequalled performance of Chevrolet in the Riverhead Races proves the Schebler claim to this honor. In racing the Schebler gives power by feeding gasoline proportionately to air. Every opening of the throttle gives more gasoline to unite with the additional air. This proper proportioning of air and gasoline at all times gives power. With every closing of the throttle at a turn the gasoline feed is reduced, and flooding or other carburetor troubles avoided. In getting away from a curve a sudden opening of the throttle gives more gasoline immediately, and the correct proportions of the mixture are retained. It is this giving correct mixtures whether at full speed or slowing up, or accelerating, that makes the

SCHEBLER
America's
Fastest Carburetor

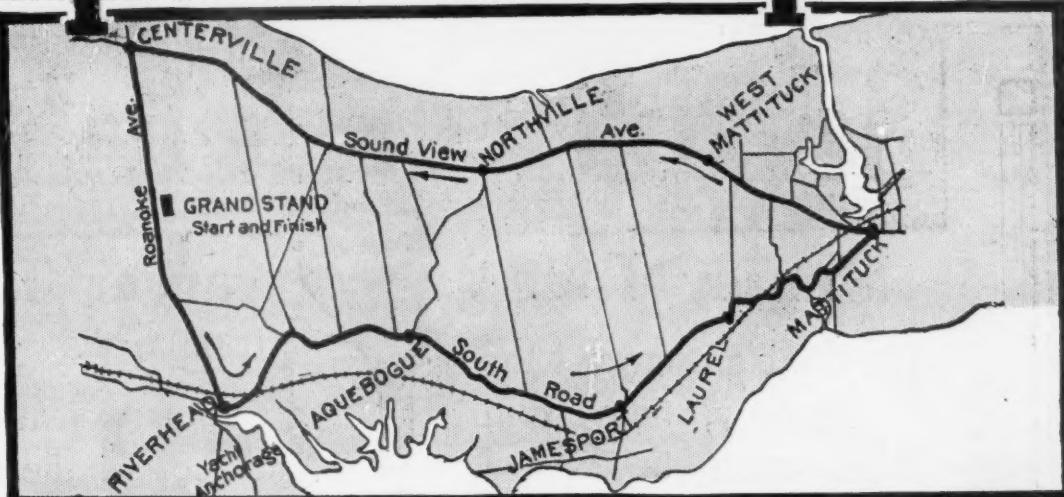
70
Miles
per
Hour



for
113
road
Miles



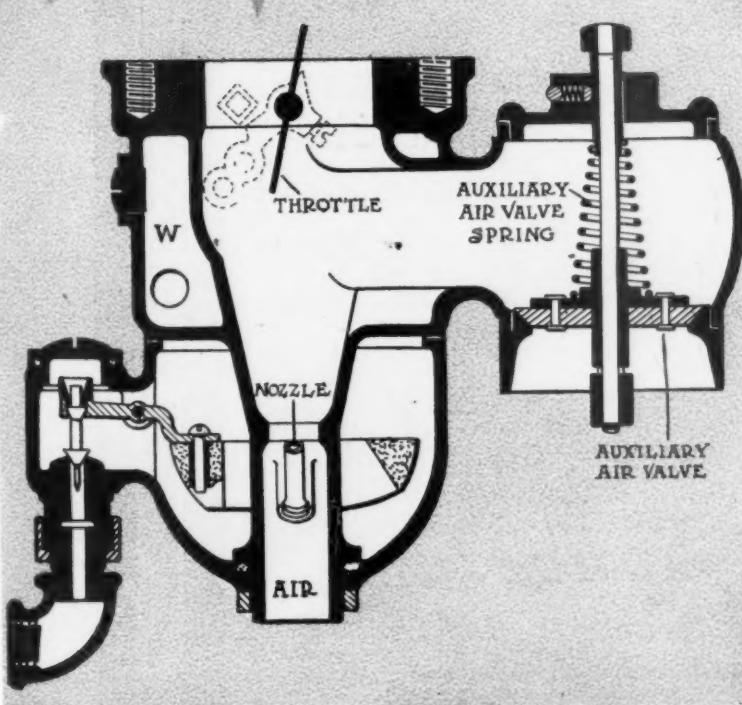
Speed Champion



RACE WAS FIVE LAPS OF 22.75 MILE CIRCUIT

ACCURACY in carburetor adjustment is possible. Nothing is more important for speed or power in a car than a good explosive mixture. A good mixture is one always having the proper percentage of gasoline vapor and air. The Schebler model L carbureror used by Chevrolet has three separate gasoline adjustments. The cut on this page shows the nozzle in the fixed air entrance, and the cut on the opposite page shows

the needle which enters this nozzle. Every opening of the throttle lifts the needle, but the amount of lift can be varied. For low speed by a thumb screw; for intermediate speed by a pointer on an eccentric which changes the profile of the adjustment cam; and for high speed by another similar adjustment. Opening or closing the throttle rocks the adjustment cam against the needle valve roller, lifting the needle valve according to the adjustment cam contour.



Two perfect road scores

Schebler Reliability

Munsey Tour

IN the eight days of the Munsey, tour from Washington to Boston and return, the Schebler made the best road score of any stock carburetor. Marmon No. 36, fitted with

Schebler

made a perfect road score until last day when it was penalized 1 point for radiator cap. No other stock carburetor made such a record. On five of the eight days rain fell. It was the hardest kind of carburetor test, but the Schebler made good in its usual form.

Kansas Tour

THE Schebler carburetor won a perfect road score in the Kansas Star tour—800 miles of five days over bad Kansas roads, part of the run being through blinding rain storms. Lynch in his Jackson fitted with a

Schebler

had a perfect road score although the car was penalized in the final examination. This test proved the highest carburetor road reliability through mud and rain. The accurate Schebler gasoline and air adjustments make this possible.

Wheeler & Schebler

Indianapolis

New York Office:
Mr. E. J. Edmund, Manager,
1576 Broadway.

Boston Office:
Mr. W. J. Connell, Manager,
36 Columbus Avenue.

Indiana

Chicago Office:
Mr. G. T. Briggs, Manager,
1438 Michigan Avenue.

Like an Invisible Block System

The KLAXON protects its user and all other traffic on the road

Imagine a railway train unprotected save by its whistle and the engineer's eyesight

The average motorist is today in a similar situation. He has speed, but no adequate means of signaling his approach. A hundred times a day he must slow down for safety's sake at blind corners and turns, or to give overtaken traffic time to turn out. Every such slow-down is a tax on brain, nerves and mechanism. Every other road user encountered without due warning has a justifiable complaint against the motorist.

The long-range sound signal is a logical necessity of motoring. The man ahead has a right to know you are coming. For your own safety, you wish to avoid sudden encounters, not only with horse rigs, but still more with other autos. You would give much, on a bad hill, to know that every car you might meet carried a KLAXON.

The sound of a KLAXON carries further than that of any other automobile signal, owing to the scientific design of its projector. And it has an indescribable *warning* quality, which puts every hearer instantly and involuntarily on his guard.

The KLAXON is NOT an "electric horn"; it is run from the ignition battery by an electric motor. We own the patent on the best electric horn ever turned out; we do not make it, simply because the KLAXON is incomparably more effective and more durable.

Send for New Artistic Catalogue - it will interest you

LOVELL-McCONNELL MANUFACTURING CO.
Manufacturers
NEWARK, N.J.

THE KLAXON COMPANY
Sole Distributors for U.S.A.
1 Madison Avenue NEW YORK

HAS it ever been your misfortune to miscalculate your distance a few inches and ruin your headlights or radiator; or, granting that your brakes are perfect—likewise your judgment of distance—has the other fellow ever BACKED into you with the above result? Maybe you haven't been stung yet—but it may happen any time, and then you'll wish you had

The "VASCO" BUMPER



***The Neatest, Strongest and Best Bumper
made anywhere at any price***

Indispensable in City traffic. Avoids accidents en tour.—Is designed to allow attachment to any car without drilling holes into the framework of the auto, thereby weakening the parts, and at the same time adding additional costs.

Any chauffeur with a wrench can in a half hour's time properly attach a "VASCO" Bumper. Our steel Bumper tube has a heavy gauge brass shell drawn over it (not plated), to be worn off after a few times polishing. Our square steel spring action is very long and stiff, giving a range of 3½" absorption force, capable of caring for a hard blow without shock, and absolutely prevents the breaking of head lamps or radiator. The springs are very carefully concealed in telescoped tubes. All the other parts are made of a superior grade of highly polished solid brass, making an attractive, practical, and damage-resisting article, very much needed in close traffic, and it will more than save its cost in repair bills on radiator lamps and guards in a short time.

**WRITE TO-DAY
FOR FULL DE-
TAILS & PRICES**

THE VICTOR AUTO

Manufacturers & Distributors

Main Office: 42 West

SOMETHING NEW
IN A

Wind Shield

Thoroughly modern and
up to the minute

The "VASCO"



A shield superior in every feature to all existing devices—meets every demand of the most exacting user. Simple, strong, easy to operate, low in price.

A shield so free from complication, that it can be opened and closed with one hand while the car is in motion. The action is easy and without violent jar, due to the use of friction discs instead of springs, such as we have in "VASCO."

In introducing the "VASCO" we desire first of all to call your attention to the design, workmanship and material.

Design—the "VASCO" is a 100% improvement over any wind shield now on the market. We have not introduced any radical changes, rather it embodies the best of the past, plus experience, backed by ample capital and facilities to produce the best that inventive genius can devise.

Workmanship—After discovering and perfecting the missing link between a "near" and a "perfect" wind shield our first thought was to make the "VASCO" so perfect and ornamental that it would help to beautify rather than detract from a car. No matter whether your AUTOMOBILE is in the one or ten-thousand-dollar class, the "VASCO" will so harmonize and add to its appearance that it will instantly become a part of your car—not an accessory to be used in emergencies, but absolutely necessary to your everyday touring and pleasure. If you can afford a car you cannot afford to be without the "VASCO."

In stormy weather or high wind it is as necessary as good brakes. The "VASCO" is so instantly accessible and get-atable that it is a matter of a few seconds (one hand adjustment) to operate it.

Material—We have installed only such material as we were convinced after most exhaustive tests was the very best regardless of cost—the price was the last consideration; our main effort was to produce the best and the price is based entirely on the quality we supply.

The price of the "VASCO" (\$35.00) is only possible through the production of many thousand shields. While other manufacturers purchase material for a few hundred, we know that the "VASCO" represents every possible improvement to be attained in wind shield construction and in purchasing all material for the entire 1910 output we are enabled to install the best obtainable at a price our competitors must necessarily pay for an inferior grade.

You really must know about the "VASCO" whether you buy or not.



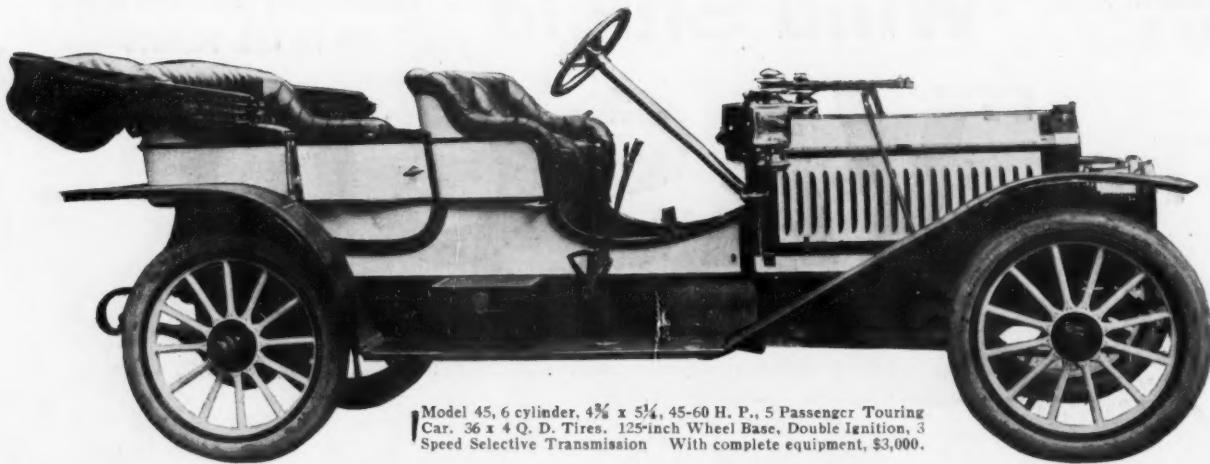
SUPPLY MFG. CO.

Automobile Accessories

43d Street, New York

WRITE TO-DAY
FOR FULL DE-
SCRIPTION.

AUSTIN



Model 45, 6 cylinder, $4\frac{1}{2} \times 5\frac{1}{4}$, 45-60 H. P., 5 Passenger Touring Car, 36 x 4 Q. D. Tires, 125-inch Wheel Base, Double Ignition, 3 Speed Selective Transmission With complete equipment, \$3,000.

To the Man Who Takes Pride in a Motor Car

There is just one car of which the most particular motorist can always be proud.

THE CAR THAT STANDS IN A CLASS BY ITSELF.

THE NEW AUSTIN MODEL "45" \$3000

The most splendid appearance, the finest engineering, and the most careful workmanship make the AUSTIN the embodiment of all that is acknowledged best in motor car construction.

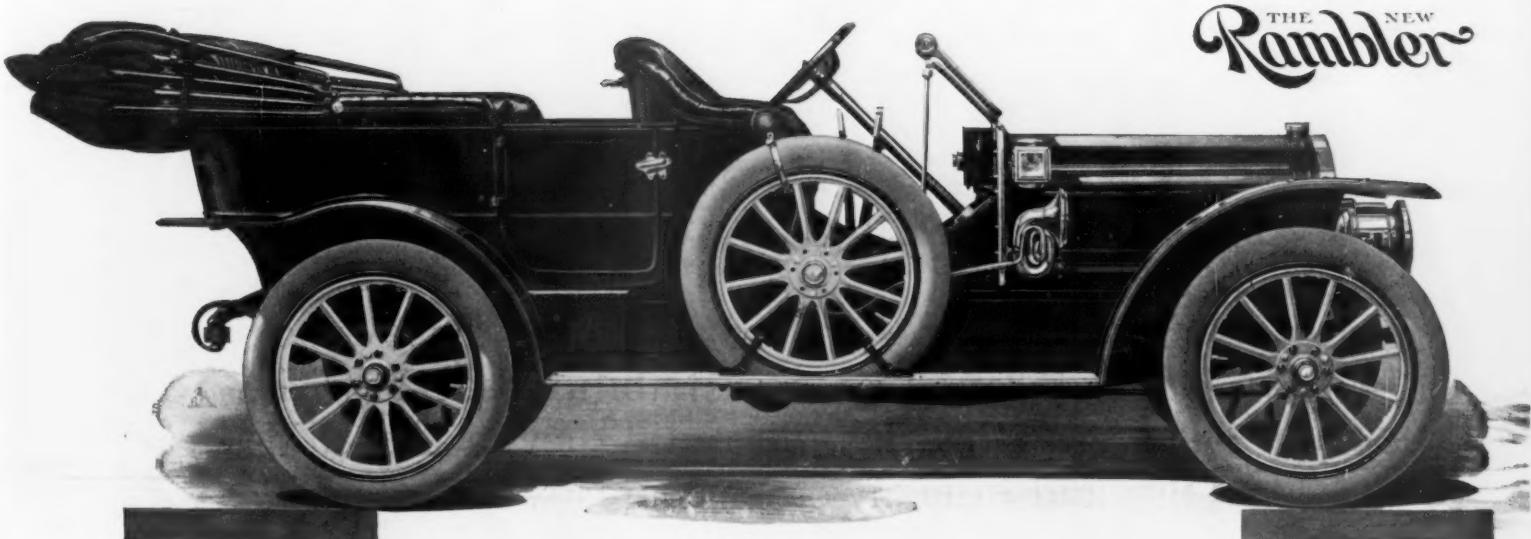
Here is undoubtedly the most attractive and beautifully designed car to be seen anywhere. It is universally admired—and, think of it! 45-60 H. P., 6-cylinder, 5-passenger Touring Car for \$3,000. There are other cars sold at \$3,000 and cheaper cars sold at less, but the finest car in all the world to be obtained for \$3,000 is the New Model AUSTIN.

If you are thinking of buying a car do not forget that the New 1910 AUSTIN at \$3,000 embodies all the essential and refined features of excellence and exclusiveness embodied in the \$4,000 to \$6,000 AUSTIN of the past few seasons. This is the highwater mark of automobile engineering—absolute simplicity of operation and control—interchangeability—absence of complicated parts—extreme accessibility at all points—the most comfortable and luxurious appearance.

We would be pleased to send detailed specifications to any inquirer on request and arrange for a trial run or personal inspection.

Model 45, 45-60 H. P., 6-cylinder, 5-passenger Touring Car, \$3,000; Model 50, 50-75 H. P., 6-cylinder, 7-passenger Touring Car, \$4,500; Model 60, 60-90 H. P., 6-cylinder, 7-passenger Touring Car, \$6,000.

AUSTIN AUTOMOBILE CO.
Grand Rapids, Mich. Chicago Branch, 1420 Michigan Ave.



THE NEW
Rambler

Model Fifty-five, 45 H. P., \$2,500, with Magneto, Lamps, Presto Tank, and Tools.

THE new Rambler is better than any previous Rambler in quality, dignity, silence and comfort, and in many respects it is superior to any other automobile; built in three models: Fifty-five, seven-passenger, forty-five horsepower, \$2,500; Fifty-four, five-passenger, forty-five horsepower, \$2,250; and Fifty-three, thirty-four horsepower, \$1,800; magnetos included.

Model Fifty-five

Capacity: Seven-passenger.

Engine: Four-cylinder, 5 x 5½.

Wheel-base: 123 inches.

Wheels and tires: 36 in. x 4½ in.

Spare wheel, with tire, brackets, and tools,

\$100.

Top and Rambler wind-shield, \$150.

Equipment: Magneto, 6-80 storage battery, two gas head-lamps, electric side-lamps, combination electric and oil tail-lamp, Prestolite tank, adjustable foot-rest and robe-rail, horn, jack, and tools.

Color: Light Brewster green, striped pea green, with cream wheels.

Thomas B. Jeffery & Company

Main Office and Factory, Kenosha, Wis.

Branches and Distributing Agencies:
Chicago, Milwaukee, Boston, Cleveland, San Francisco. Representatives in all leading cities.

THE CAR OF STEADY SERVICE

Q.-When are Old tires better than New tires?

A.-When they are Goodrich Tires!

It is pretty good proof of tire endurance when a set comes through a long reliability contest without change. Goodrich Tires did that in the Glidden Tour and in many other contests.

**But the WINNING ELMORE in the
MUNSEY RELIABILITY CONTEST**

—a contest of 1282 miles in seven days, averaging 183 miles a day for a week—this winning Elmore was shod with the SAME OLD

GOODRICH TIRES

which had carried the Elmore through the PHILADELPHIA-PITTSBURG Run—and which had been in service EVER SINCE that run!!!

One endurance run is a good sized task for any kind of tires—and no disgrace if more than one set are used;—but one run doesn't make a summer for a Goodrich equipment.

If this be "luck"—make the most of it

**The B. F. GOODRICH COMPANY
AKRON, OHIO.**

Branches in the Principal Cities

RIGHT FROM THE START

The Stewart Speedometer became popularly known as the

“ALWAYS ON THE JOB”

Speedometer, a reputation it has steadfastly maintained against all competition. It is correct principle (Multipolar induction), sturdy, simple construction, and exclusive features such as the Stewart shaft and patented ball bearing swivel joint, that have made possible both its "Always on the Job" reputation and the



Absolute Five-Year Guarantee

that covers all Stewart instruments

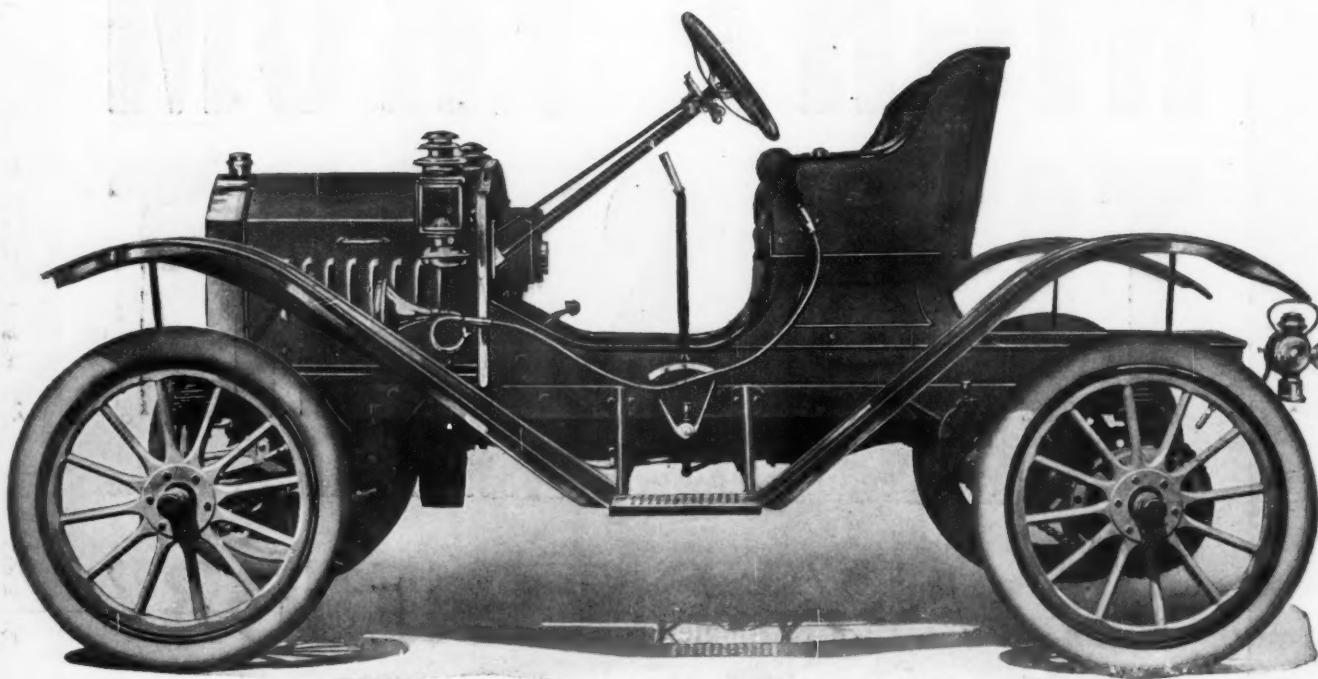
Every motorist who tries a Stewart becomes an enthusiastic booster

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Stewart & Clark Mfg. Co.

510 Diversey Blvd., Chicago, U. S. A.

EVERYMAN'S CAR AT LAST



1910 BRUSH

Everyman's car—merchants, physicians, city and country salesmen, contractors, corporations, farmers, clubmen, suburbanites, the young folks,—the Brush knows no class; there is no limit to its usefulness—no limit to its sale.

A MARVELOUS CAR at a MARVELOUS PRICE

A car which, with one chassis, adapts itself perfectly by change of bodies to a hundred different uses.

Not a designer's hope, but the result of years of experience and the knowledge acquired by manufacturing the 3,000 Brushes in use—a car new in power, smoothness, speed and looks, yet built on proven principles by an organization already perfected.

This is the first time a sensation has been sprung that was not something entirely new and built on expectation rather than experience.

The 1910 Brush not only outclasses all competitors, but is miles ahead of its own previous high standard.

Its balanced motor is the greatest Brush achievement. The result is single cylinder simplicity, reliability, light weight, low gasoline and oil consumption—4-cylinder power and smoothness. The most wonderful improvement in motor-car construction in years.

Its performance is almost unbelievable. You will swear it is a 4-cylinder. You must see it—in fact, you must ride in it to be convinced.

Its power is astonishing. It responds to the throttle instantly, and it eats up the hills. More speed than you need—thirty miles an hour is easy—forty if you want it.

You simply **don't know** what a single cylinder motor car is until you have driven this new Brush.

While the balanced motor is the most remarkable feature of the Model D, we have made numerous other improvements and refinements.

Here are some of them: wheel-base lengthened 6 inches; more graceful and rakish lines; Mercedes type radiator; new selective control; universal coupling shaft; improved dust-proof commutator; multiple disc low and reverse clutches; transmission control levers entirely housed and oil-tight; more quiet muffler.

SOME THINGS THE BRUSH HAS DONE

In the 1909 Glidden Tour the Brush covered the 2,636 miles in 15 days and finished in good shape in Kansas City—a lot more than can be said of some of the big cars.

In the "Little Glidden," at Minneapolis, it finished with perfect road and technical scores and won the Gregg Trophy over three 4-cylinder cars.

It climbed Pike's Peak in eight hours, every inch of the way under its own power.

It crossed the American Continent.

Last year it won the Algonquin Hill-Climb in its class. Barred this year.

In the Denver Motor Club Run, Denver to Pueblo and return, the Brush was the only car out of sixteen—most of them big ones—to finish with a perfect technical score.

In the 1909 New York One-gallon Fuel Test, the Brush made 40.6 miles on one gallon of gasoline. In the Buffalo contest it made 41.2 miles on one gallon. This means less than 3-8 of a cent a mile for fuel.

Other notable performances are the Five-car Efficiency Run, the Atlanta, Ohio, Michigan and Kansas City Endurance Runs.

WE ARE BUILDING 10,000 and the PRICE is \$485.00

How many thousand times have you heard the expression, "When they get a reliable automobile down to the cost of a good horse and buggy, I'll buy one"? Here it is!

A car for less than \$500.00!

The price the great American public has been waiting for--the goal manufacturers have been vainly striving to reach since the first motor-car was built.

We have reached it!

An automobile built on the quality standards of the highest priced cars--a price less than \$500.00.

If ours were a new concern, just beginning to learn the lessons all manufacturers have to learn, you might have reason to doubt the quality of a car at this price--but we have learned the lesson--the 3000 Brush cars in daily use have proven the quality of Brush workmanship and material.

Our magnificent new plant, designed and equipped for building the Brush in 10,000 lots, insures the limit of economy in manufacturing. The raw material is unloaded at one end of the factory, the finished product is put on the cars at the other end.

Every part is made in our own factory except the tires, wheels and electrical equipment. The buyer pays no parts-makers' profits.

TEAR OUT THIS COUPON

MAIL IT TODAY

10,000 Cars Won't Last Long

This will bring you our Special Proposition to Dealers.
Address

BRUSH RUNABOUT COMPANY
1011 Baltimore Avenue DETROIT, MICH.

Name

Street

City

Besides our already splendid equipment, we have added an enormous amount of special machinery to do every factory operation in the most economical as well as the most accurate way.

And it's a peculiar fact that in quantity manufacture the most economical is, as a rule, the most accurate.

Even with our perfect manufacturing facilities we could not make a car of the quality of the Model D if we merely imitated a big car with all its complicated parts, only smaller and more delicate. Here's where the genius of the designer counts.

The Brush has the fewest possible parts, but they are all of sufficient size and strength to stand the hardest knocks. Simplicity makes it possible to build the car right and still sell it at this wonderful price.

Our branch managers and several dealers who have seen the car are wildly enthusiastic over it. Chicago orders 1,500; Detroit, 800; one Western dealer 1,200; another 750.

When the public sees it, it will be the most talked-of car in America. Think of it, \$485.00 for the best built, most thoroughly proven, smoothest running, easiest riding, most reliable, most economical, most powerful, handiest small car in the world.

Every man who drives a horse, rides on a car, or owns a big automobile is a prospect.

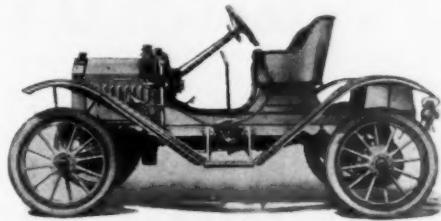
Each one sold sells another—and they stay sold; the profits are not eaten up in free repairs. No trouble for the owner, means no trouble for the dealer.

Merely judging from this year's experience and the orders already received from branches and dealers, these 10,000 cars will be snapped up in a few weeks. Now is the time to close for **your** territory. Get in before it is gone.

SPECIFICATIONS

MOTOR—10 H. P., *balanced* single cylinder, four-cycle, vertical, 4" x 5", water-cooled; located in front under hood; every part instantly accessible; three point suspension.

BALANCING—After balancing by the usual counterweights, one extra loaded balance gear, driven by a crankshaft gear, is applied, the result of which is to take out *all* of the vibration due to reciprocating weight and in addition *most* (or at times *all*) of the torque vibration—theoretically *in better balance than a four-cylinder motor.*



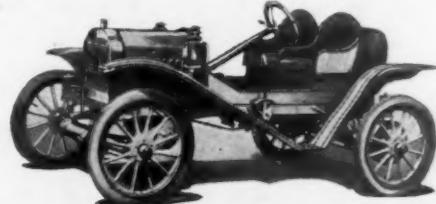
Model D 22

TRANSMISSION—Internal gear type, perfectly quiet; multiple disc clutches for high, low and reverse; entirely enclosed and absolutely oil-tight; driven through universal coupling shaft.

COOLING—Mercedes type radiator, on Briscoe thermo-syphon system, eliminating pump.

DRIVE—Bevel gears 15-tooth and 24-tooth to countershaft; double side chains to rear wheels; 16-tooth sprockets on jackshaft, 50-tooth on rear hubs; bevel gear set and differential are located and run on four very ample ball bearings.

CONTROL—Single hand-lever of selective action for all speeds; spark and throttle under steering-wheel; foot-pedal releases clutch without touching the hand-lever, and also applies the brake. This clutch release by the foot is one of the fine features of the Brush and is found on no other low priced car.



Model D 26

STEERING GEAR—Another exceptional feature; internal reducing spur gear, slow and powerful at straight ahead and accelerating as the wheel turns; entirely enclosed and oil-tight.

AXLES AND FRAME—Oil-treated, selected wood, oak, hickory and maple; wonderful for strength, durability, lightness and flexibility.

SPRINGS—Spiral, located at extreme four corners; absolutely the easiest riding springs on any car and mechanically impossible to break.

BRAKES—Internal expanding in rear sprocket



Model D 24

hubs; larger than on most cars of twice its weight.

WHEELS—Artillery, with 28" x 3" pneumatic tires.

WHEEL BASE—80 inches.

TREAD—56". For Southern trade 60".

EQUIPMENT—Tools, tire kit, 3 oil lamps and horn.

COLOR—Maroon, except coupe.

BODY—Divided seat; trimmed in high-grade leather. Platform on rear. Six special bodies, as illustrated below, furnished on order as follows: rear platform with steel tool box; rear compartment with removable steel deck;

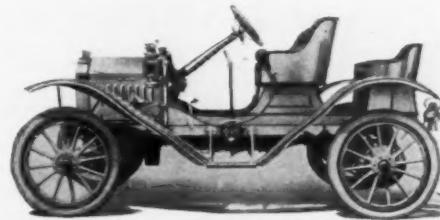
single or double rumble with wooden tool box; racer type; coupe.

SPEED—35 miles an hour, except racer type, which has special gearing.

PRICE—\$485.00.



Model D Coupe

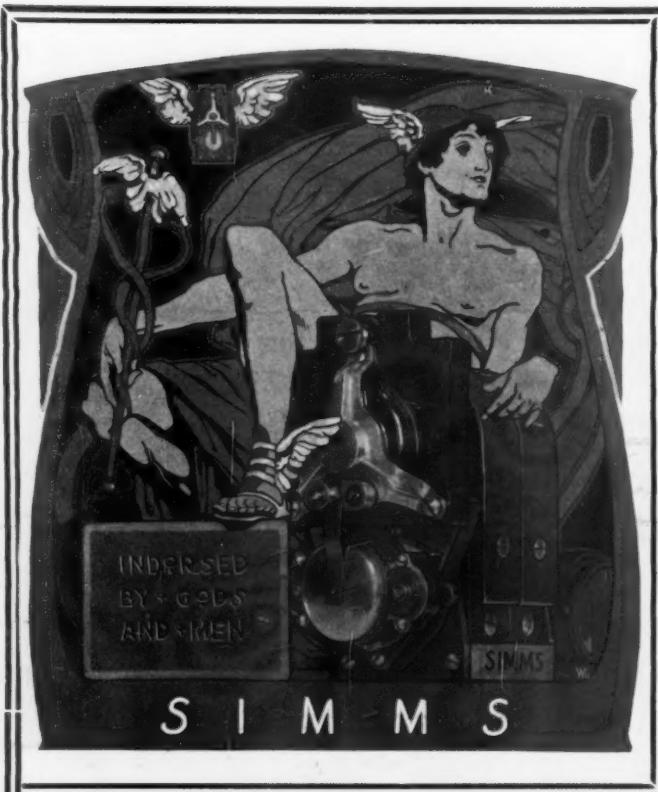


Model D 28

BRUSH RUNABOUT COMPANY

1011 BALTIMORE AVENUE,

DETROIT, MICH.



**"A TRIUMPH
OF
EFFICIENCY"**

The ORIGINAL

**SIMMS
MAGNETOS**

THE magnetos that hold the enviable, unblemished reputation for the greatest achievements, on two continents, for the past twelve years.

LET US QUOTE YOU PRICES

Orders Placed Now can be filled promptly.
Later orders may be subject to delay.



STANDARD OF THE WORLD

for 12 YEARS



**Standard because they give
the greatest motor efficiency**

We sold the title formerly used. Our magnetos are now known as

SIMMS

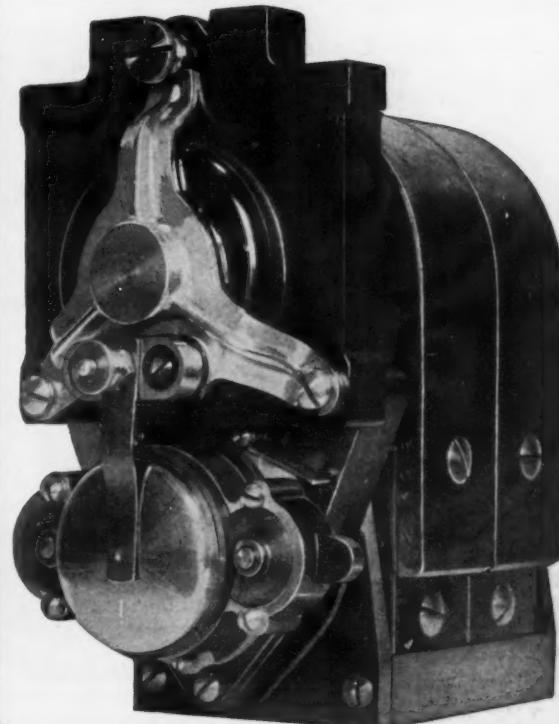
MAGNETOS

THEY give the hot-
test spark—They
are guaranteed for life
—They are carried on
the greatest motor
cars—They are sold
everywhere.

ALBERT R. MILLER

Sole American
Representative

42 Broadway
NEW YORK



New Noiseless Drive

Makes the



The Quietest Electric On Earth

In the new Waverley the Motor is attached to the body with rubber cushions, which overcome the vibration. It thus hangs between the springs. The power is transmitted to the floating rear axle through a silent flexible gear enclosed in a dust-proof case and running in oil. No other system attached wholly to body is completely enclosed. The Waverley's dust-proof case prevents any noise and keeps out the grit. The Waverley Herringbone gear on the floating rear axle overcomes any jerking and knocking of the ordinary cog.

Waverley Controller Means Perfect Safety

This is the new Waverley Controller (Waverley Patent No. 928028) which makes the Waverley 1910 Model the safest of all vehicles. The Waverley positively cannot be started on any speed except the low. No tampering with the handle while the driver is out of the carriage—no carelessness whatever—can cause a sudden jump of the car forward or backward. The handle positively has to go back to neutral and then shifted into first speed before a wheel turns.

Knife Blade Contacts

The Waverley Controller uses the system of **Knife Blade Contacts**, adopted in most up-to-date electrical construction. In passing from one speed to another the contact of one speed is not broken until after the contact for the next speed has been made.

The controller proper consists of a core on which are assembled blades of various widths and locations, which engage on fingers consisting of two pieces which are assembled on the frame of the controller. These make the knife-blade contact of liberal area with different speed notches. The blades are made of brass and the fingers of phosphor bronze, thus making the parts of good wearing quality.

The speed control consists of four notches, the first two being resistance notches with the motor field in series, the third and fourth with the motor fields in series and multiple respectively, the battery cells being in series at all times. There are four reverse speeds similar to the four forward speeds. The method of connec-



**Waverley
Controller
Used on
1910
Models**

tion is such that the circuit is never broken after the power is once applied. This patented feature gives a continuous torque to the motor and prevents any jerk or arcing between the speed notches.

The Interlocking Device

The interlocking device of this controller is its most valuable feature. The speed direction of the vehicle cannot be changed with the power on. If for any reason the controller should freeze or become inoperative and the controller handle is left on a speed notch, the reverse lever handle can be brought back to neutral position, and the vehicle will not become operative again until the handle of the sped lever is brought back to off position and then applied.

On other controllers the emergency key is a current-carrying member. With the new Waverley Controller the emergency key is fitted in the top of the reverse lever and serves to mechanically unlock the position of the reverse lever switch. This reverse switch has three positions—forward, neutral and backward. In neutral position a tongue engages automatically the fixed part of the controller's frame. The key serves the purpose of disengaging this tongue, which allows the reverse switch to make the electrical connections for either forward or backward motion, and does away with a plug switch.

The Waverley Controller is non-arcing, and there is no possibility of fusing in changing of speeds. The controller and wiring transmit all the current they receive from the battery to the driving system without loss or diminution of power. Among electricians it is customary to allow for two volts loss to the controller and wiring, but the high efficiency of the Waverley Controller is shown by the loss of less than one-half volt.

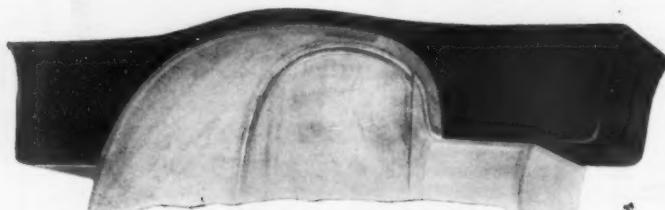
Waverley Patented Drop Sill

We show here another exclusive feature which makes the Waverley the most desirable electric on the market. It is the Waverley Drop Sill (Patent No. 38621). This drop sill not only adds to the distinctive grace of the coupe, but makes it the most popular with women, owing to the ease of entering and leaving.

Our drop sill brings the coupe so low that the step is even with many curbs, and not more than eight inches above any. From the step to the inside of the coupe is only 11 inches.

Our Big Advertising Campaign

The attention of dealers is called to our big advertising campaign—the biggest ever made on electric vehicles. We will reach every motor car buyer in the country through the highest grade mediums. Now is the time to reap the harvest. Our 1910 4-passenger coupe is the handsomest and most efficient car ever designed. Write to us today for particulars.



Waverley Drop Sill, 1910 Model

When Writing to Advertisers, Please Mention Motor Age.

The Waverley Company

South East Street, Dept. F.

Indianapolis, Ind.

The MODERN Carburetor KINGSTON



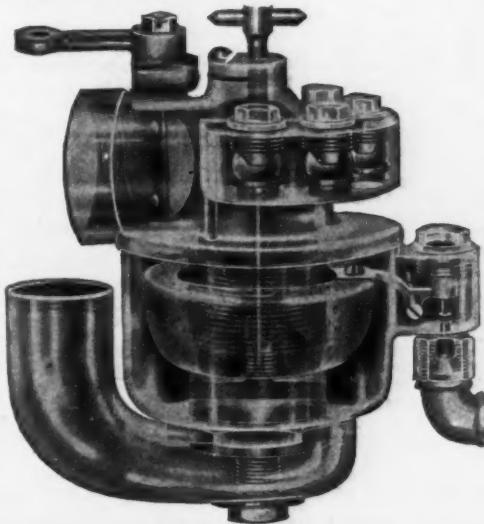
CHALMERS-DETROIT "30" WINNER of
INDIANA TROPHY

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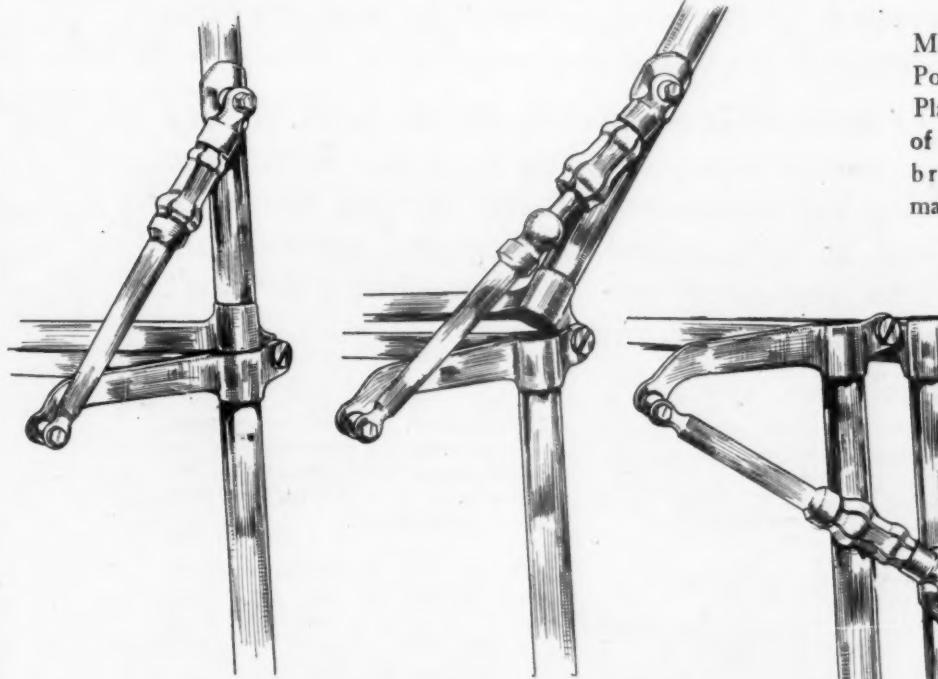
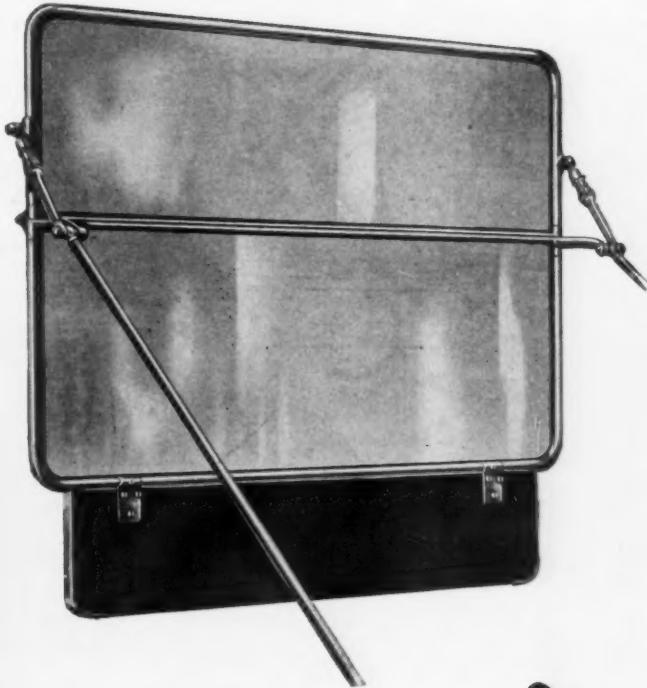
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All necessary fixtures included.

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The man who buys an Overland does not carry his car's record in name only—he has the record built right into his own individual machine.

He can be sure that the past service records of Overland cars, which prove a service worth in every respect equal to that of any car regardless of price—are certain to be duplicated by the Overland he himself buys.

Every one of the thousands of Overland cars now in active service is demonstrating its ability to carry a given load farther at less expense than any other motor car made.

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24 Horsepower. Planetary transmission, 2 speeds forward, 1 reverse. Roadster body, Single or double bucket; 2, 3 or 4 passengers; Price \$1000. Rear Seat Combination Extra.

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Choice of bodies with any of these models. Have our nearest dealer demonstrate the Overland for you. You'll wonder why any car costs more.

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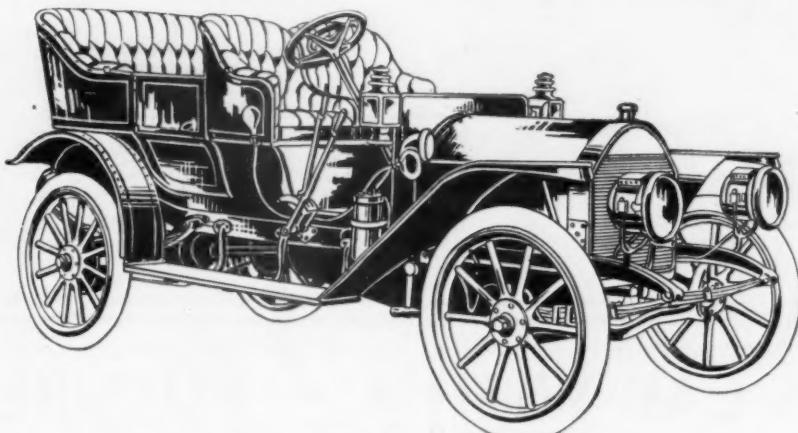
Standard Mfrs., A. M. C. M. A.

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F.A.L.CAR



Model "M" Touring Car, \$1650
With Magneto, Lamps, Speedometer and Tools.

The F-A-L car is a new standard of value in design and equipment and is up to the moment, the following specifications bearing evidence. (Then remember the price.)

TYPE "M" SPECIFICATIONS:

Axle—Front, single piece drop forging—I-beam section, ball bearing. Rear, semi-floating—alloy steel, heat treated, ball and roller bearing.
Brakes—Double equalizing, both on rear wheel drums.
Bodies—Sheet metal.
Carbureter—Stromberg.
Clutch—Cone type faced with asbestos composition.
Color—Balkan blue—running gear light canary.
Drive—Shaft—bevel gear.
Frame—Pressed steel—channel section.
Horsepower—Thirty.
Ignition—Dual.

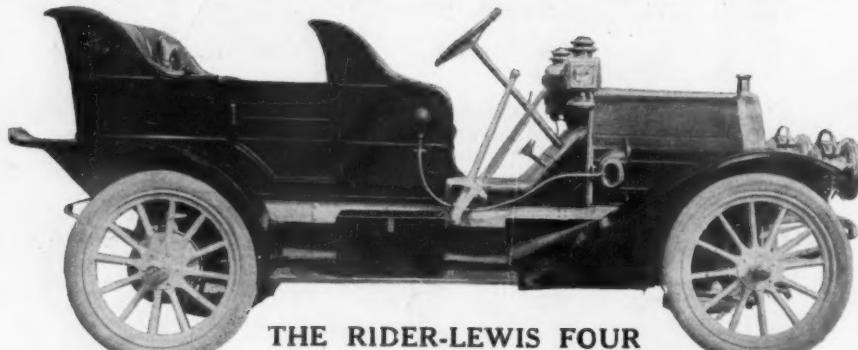
Lubrication—Splash, constant level—self-contained.
Cylinders—Cast in pairs.
Speed—Five to fifty miles on high gear.
Springs—Front, half-elliptic—40" long—2" wide. Rear, three elliptic—2".
Steering Gear—Worm and sector—ball bearing throughout.
Tires—Toy-tonneau, touring car—speed car 34x3½"—town car—34x4", Q. D.
Transmission—Silent type, three speeds forward and reverse, annular bearings throughout.
Wheelbase—One hundred and ten inches.
Equipment—Three oil lamps, two gas headlights, generator, horn, magneto, speedometer and tool equipment.

Fal Motor Co.

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A CAR WITH A FUTURE

A car of refined, pleasing lines, masterly construction, ample strength and irreproachable mechanical design. A car with friends throughout the whole country. A car at a price to fill a long felt want.

WHAT COULD BE MORE PROPITIOUS?

A valve in the head motor: Any expert can explain the advantage of this construction, which ranges from 15 per cent to 25 per cent higher in economy and power. The snap and power with which the Rider-Lewis "30" accelerates is rarely found in forty horse power motors.

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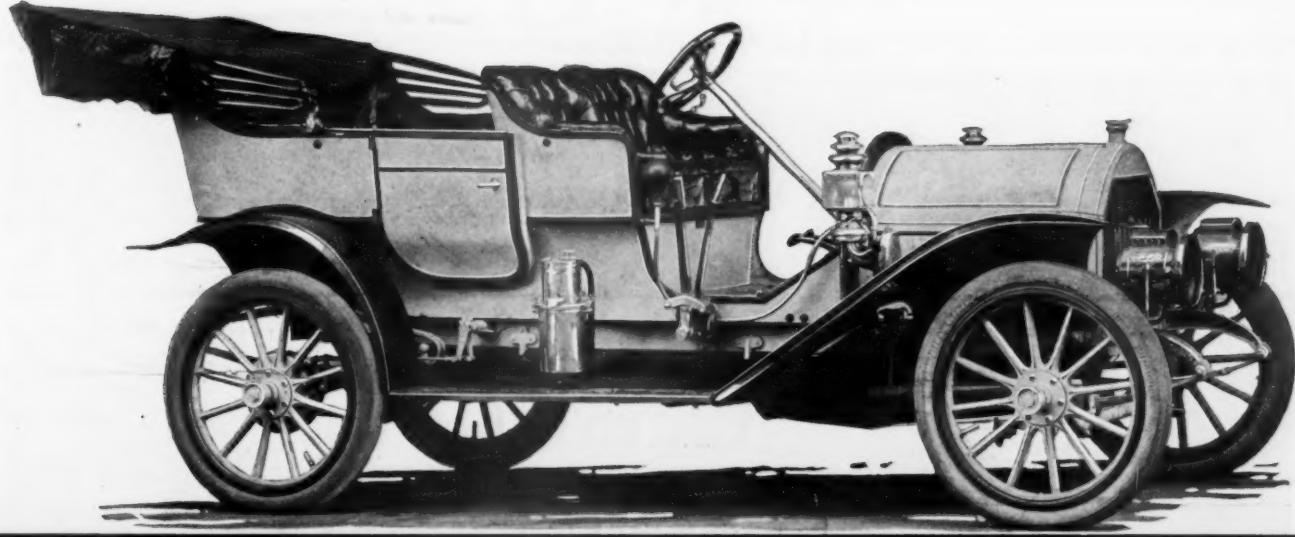
Four Cylinders. Valves in the head. Magneto Ignition. Thermo-Syphon Cooling. 32-inch by 3 1-2-inch Tires. Flexible Motor Supports. Rear Axle Gear Set, 3 Speeds. Straight Line Drive. Light Weight. 100-inch Wheel Base. SIMPLICITY THE VERY KEYNOTE OF THE DESIGN.

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The evolution of the REGAL leading up to the 1910 cars, represents a simple and harmonious relation, coupled with such refinements in design as 2,000 well behaved cars in actual service would naturally indicate.

With the accumulated experience of 2,000 satisfied users at our back, it required no undue confidence to undertake 3,000 REGAL cars for 1910, but we find ourselves confronted by a 6,000 car demand.

Obviously, there will be a shortage and to be sure of a '10 REGAL, means ORDER NOW.

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4-Cylinder Motor,
30 Horsepower.
5-Passenger Body,
107" Wheel Base,
Full Lamp Equipment
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Regal Motor
DETROIT,

1910.

'10 REGAL INCLUDES

Water cooled motor with 4x4 cylinders, integral camshaft, large valves, and a liberal crankshaft properly made.

Thermo siphon cooling with special means of preventing steaming which will attract discriminating notice.

Lubrication by splash, with a reservoir to take the excess, and a master pump to maintain a constant level. The tell-tale works with a float, is high up and can be seen.

Roller Bearing transmission, selective type, sliding gear, on rear axle, gives three speeds forward and reverse.

Metal body, assures stability, presents lines, and a roomy tonneau.

Tires, 32x3½.

YES, alloy and special grades of heat treated steel and other proper selections, for parts, PRODUCING A STANDARD CAR AT WHAT SHOULD BE THE STANDARD PRICE:

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Projects the light a distance of 1200 feet. Gives 3 times the candle power of your old Fan-Tail. Absolutely steady—no flicker—no jarring out. Can't crack the reflector. Can be used in any form of headlight or searchlight lamp, for automobiles or motorboats. Can be attached in two minutes to old connections.

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**UNEQUALED FOR
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SEPTEMBER 29, 1909

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1st.....	DePalma	Fiat	Michelins "As Usual"
2d.....	Disbrow	Rainier	Michelins "As Usual"
3d.....	Lund	Rainier	Michelins "As Usual"

Class 2--182 Miles

1st.....	Lescault.....	Palmer-Singer.....	Michelins "As Usual"
2d	Hughes.....	American.....	Michelins "As Usual"

Class 3--136.5 Miles

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1st.....	Chevrolet	Buick	Michelins "As Usual"
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In the Class 4 Contest Chevrolet averaged 70 miles an hour, the highest distance speed ever attained by a stock car in a road contest. He used Anti-Skids (Michelins of course) on his rear wheels. They did not impede his progress and made his journey safe.

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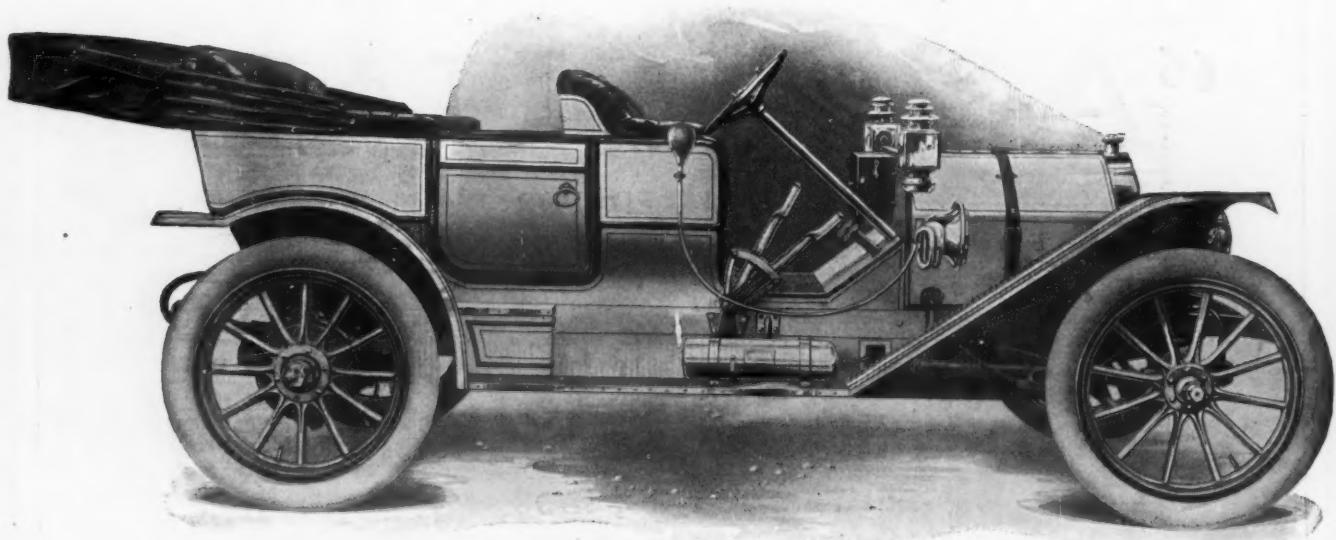
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Dealers have snapped up every 1910 car it will be possible for us to make **unless we succeed in getting additional parts.** We are making an effort to increase BY 100 PER CENT the number of cars we had originally intended to make.

New territory will be assigned as rapidly as conditions will permit.

The only car of established reputation selling at a moderate price has proven one of the biggest of the 1910 successes.

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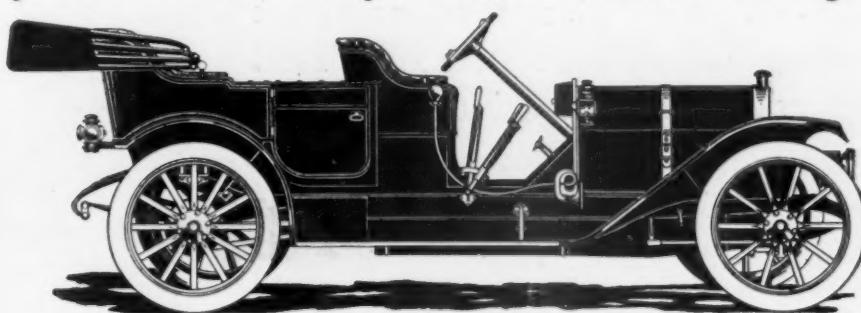
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KLINE CAR

THE KLINE CAR has instantly taken its place among the leaders. This is plainly evident from the hundreds of inquiries, telegrams and personal calls received from Agents since our first announcement which appeared in this paper September 16th.

We attribute this wonderful compliment paid our product to our specifications and price, together with the high reputation of our General Manager and Designer, Mr. James A. Kline. His past success as General Manager and Builder of the "PULL-

MAN" car is too well known to necessitate comment. Wide awake Agents are anxious to represent a car of Mr. Kline's creation.



an automobile of the very highest grade at a non-prohibitive price.

From the start we have had everything in our favor, with no handicap to overcome; ---a fresh clean factory thoroughly equipped with the most modern machinery---no old equipment that was "good enough" to last another year,---no old parts carried over from previous models to be made use of. Therefore, the KLINE CAR as offered represents the very newest and best in 1910 construction. Our many years experience as successful builders, together with the natural advantages which were at our command, make it possible to produce the best value ever offered, and one in which the wide awake agents are quick to see the great money-making possibilities.

Our Agency proposition is as thoroughly fair as our car. It is of the "live and let live" policy and if your clients are among those who demand the best at a fair price you will do well to write for our Agency terms at once.



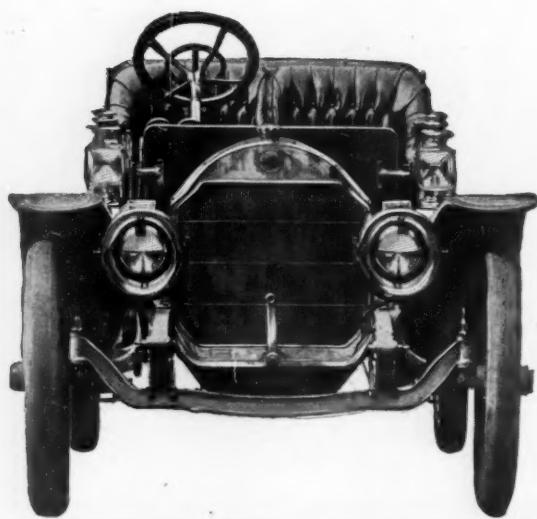
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THE Premier is built up to its name. It has proved itself the premier car in every premier service contest of America, year in, year out.

TYPICAL of its entire record is its best of all average showings in the 1907, 1908 and 1909 contest for the Glidden Trophy.

THIS character of performance is invariably duplicated by Premiers in private use—only regular stock Premiers have ever been built for sale or for competition.

YOU cannot really know motor-car value until you know the Premier. See it, know it. Let us send you its records.



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5 or 7 Passenger Touring Car:
Single and Double Roadster:
The Clubman, Tonneauette Car:
Single Ignition, \$2,500:
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5 or 7 Passenger Touring Car:
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The Clubman, Tonneauette Car:
Double Ignition, \$3,500.

PREMIER MOTOR MANUFACTURING CO.

INDIANAPOLIS

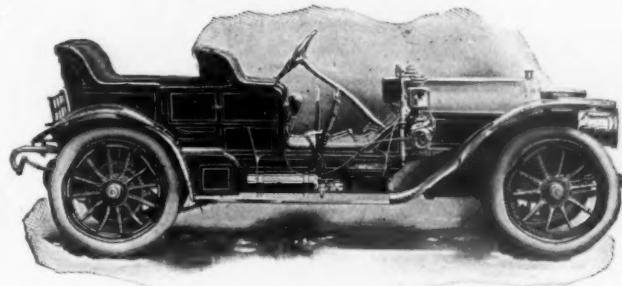
Standard Mfrs., A. M. C. M. A.

IND.

The Car That is Easiest Cared For

Ask any chauffeur who drives a Stearns. He'll tell you that no other car is so easy to keep in good order, that no other car is so consistent year in and year out—so free from petty troubles.

No other car stands so many "hard knocks." No other stands up so well under punishment.



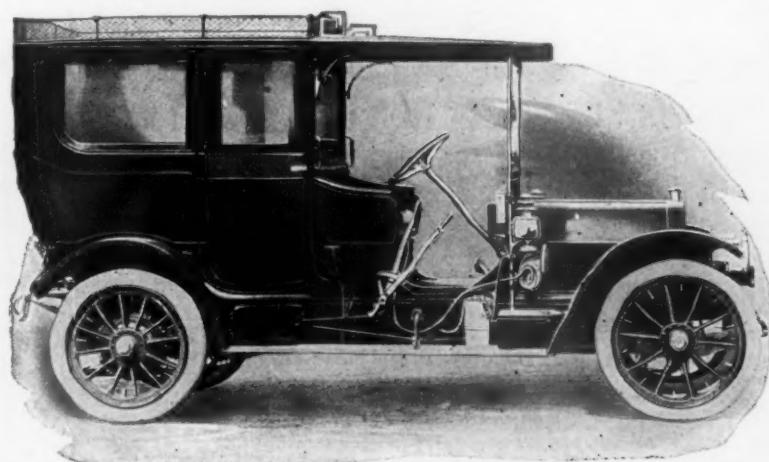
A Popular Model—Toy Tonneau Style,
With either 15-30 H. P. or 30-60 H. P. Chassis

The Stearns is the car that takes all the drudgery out of the chauffeur's work. All chauffeurs hope some day to drive a Stearns. All motor car owners hope some day to own one.

It's the car that means most to both owner and chauffeur.

It saves the most money in the long run.

Thousands of men pay for lesser cars more than the Stearns would cost.



The 30-60 H. P. Chassis with Limousine Body

"The White Line Radiator belongs to the Stearns"

They buy cars that are old in one season. Then buy another the next. They are paying the price of the Stearns—and more—with-out having the car they want.

The Stearns grows better, with proper care, up to 15,000 miles. Its second year is better than its first. Our races are won by cars which have seen at least two season's active use. Nobody knows how long a Stearns will last, for no Stearns has ever worn out.

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That's why the car endures. That's why it is safe. That's the source of its wonderful power.

*The
Stearns
The Ultimate Car*

The car as now made is perfection. We have spent 13 years in making it better, and there's little room to go further.

You can wisely buy a Stearns to keep. For there will never be, in all probability, any radically better car.

Please write for our latest catalog.

A Reminder
THE F. B. STEARNS CO.
(Member A. L. A. M.) Cleveland, Ohio

Please send me Catalog No. 56

We have room for a few live dealers who want to sell "the ultimate car," for we are adding to the factory and will increase our output. Those who want consideration must get in touch with us quickly.

GEISZLER NON-SULPHATING STORAGE BATTERY



Superiority Proven

THE GEISZLER NON-SULPHATING STORAGE BATTERY was such a great improvement in Storage Battery manufacture, and their non-sulphating features being of such an immense advantage over the old process, it was found upon introducing them, that a grave doubt existed in the minds of the public whether our claims were founded on fact or were merely a bold advertising scheme. This feeling was greatly increased by the clamorous denials of our claims by battery manufacturers in general.

To convince the automobile industry that Geiszler Non-Sulphating Storage Batteries were all that we claimed them to be we reduced our original price list 50%, or very nearly down to cost price, and added our positive Guarantee of Perfect Satisfaction or Money Refunded.

We have maintained this price for 3 years. There are now 12,000 Geiszler Non-Sulphating Storage Batteries in use, representing a value in excess of \$200,000, bearing our positive guarantee, and they are giving perfect satisfaction.

**ASK THE MAN WHO HAS ONE
OUR NON-SULPHATING CLAIMS are PROVEN**

We therefore recall our former price list and announce an advance of 33 1-3% on price list of all sizes of our regular Igniter Batteries, which advance, however, still leaves our price lower than any of the so-called high grade batteries.

1910 PRICE—Size 66, 6-Volt 60 Ampere Hour, \$20.00. Guaranteed to give perfect satisfaction, or money refunded any time within one year from date of purchase.

Geiszler MIDGETS, price \$2.50 each.

Our literature contains much valuable battery information, and it will be a pleasure to send you a copy. Dealers and Jobbers will find our 1910 proposition more attractive than on any other storage battery. Full information on request.

GEISZLER BROS. STORAGE BATTERY CO.

1514 West 57th Street

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"KEYSTONE GREASE"

The World's Greatest Lubricant

No car can last long without perfect lubrication—perfect lubrication means long life to all moving parts—without a perfect lubricant satisfactory results cannot be obtained.

For nearly thirty years KEYSTONE GREASE has withstood the test of time and service. It holds the record for lowest friction and greatest endurance tests. It is endorsed by the leading mechanical engineers, auto manufacturers and owners throughout the civilized world, and is justly recognized as the "WORLD'S GREATEST LUBRICANT."

IT CAN ALWAYS BE DEPENDED ON TO GIVE PERFECT SATISFACTION

It is a natural lubricant of high grade refined petroleum of sufficient density not to waste off like oil, but stay where put and lubricate perfectly to the last small particle.

Contains nothing to decompose—is not soluble in water—is not affected by heat or cold. Its natural density never changes with variations of temperature. We guarantee that it won't "thin out" or "thicken up." In the Cobalt Mining Districts, where it is often 40 degrees below zero, "KEYSTONE" is universally specified. In the Canal Zone, where the BEST is required, the U. S. Government specifies KEYSTONE GREASE.

If you want the best lubricant use "KEYSTONE" Grease. Its superior lubricating and lasting properties make it the cheapest lubricant you can buy.

Sold at Auto Supply Stores and Garages or direct from

KEYSTONE LUBRICATING COMPANY
PHILADELPHIA, PENNA.

Chicago, Tacoma Bldg.
New York, Automobile Dep't,
1777 Broadway.

Boston, Oliver Bldg.
New Orleans, 610-12 Chartres
Street.

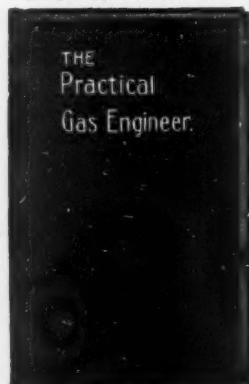


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Better

Saves
Money

To Know What to Do and How to Do it

When your gasoline motor or gas engine gets stubborn, can be quickly learned by owning a copy of the



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A practical treatise on the theory, construction, operation, care and management of all forms of automobiles, with upwards of 500 illustrations and diagrams, giving the essential details of construction and many important points on the successful operation of the various types of motor carriages driven by steam, gasoline and electricity. This is probably the best comprehensive treatise published in simple language, so that the contents may be readily understood by the intelligent reader, especially if he has a machine to which he can refer for demonstration of many points discussed. For one who desires to understand automobiles, it is an excellent work to begin with before going deeper into the subject along highly specialised lines.

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Fitted with Internal Combustion Motors.

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FORREST R. JONES, M. E.
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Size, 4½ x 7 inches. Pages, 184.
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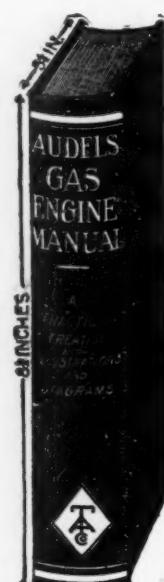
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The Automobile Business in All Its Phases.

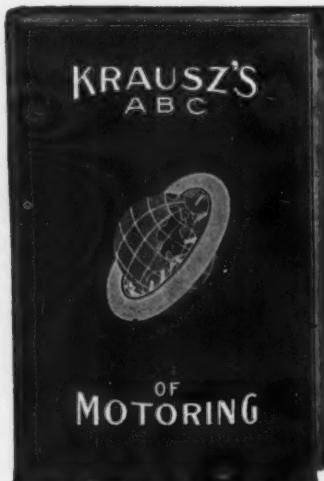
Krausz's ABC of Motoring

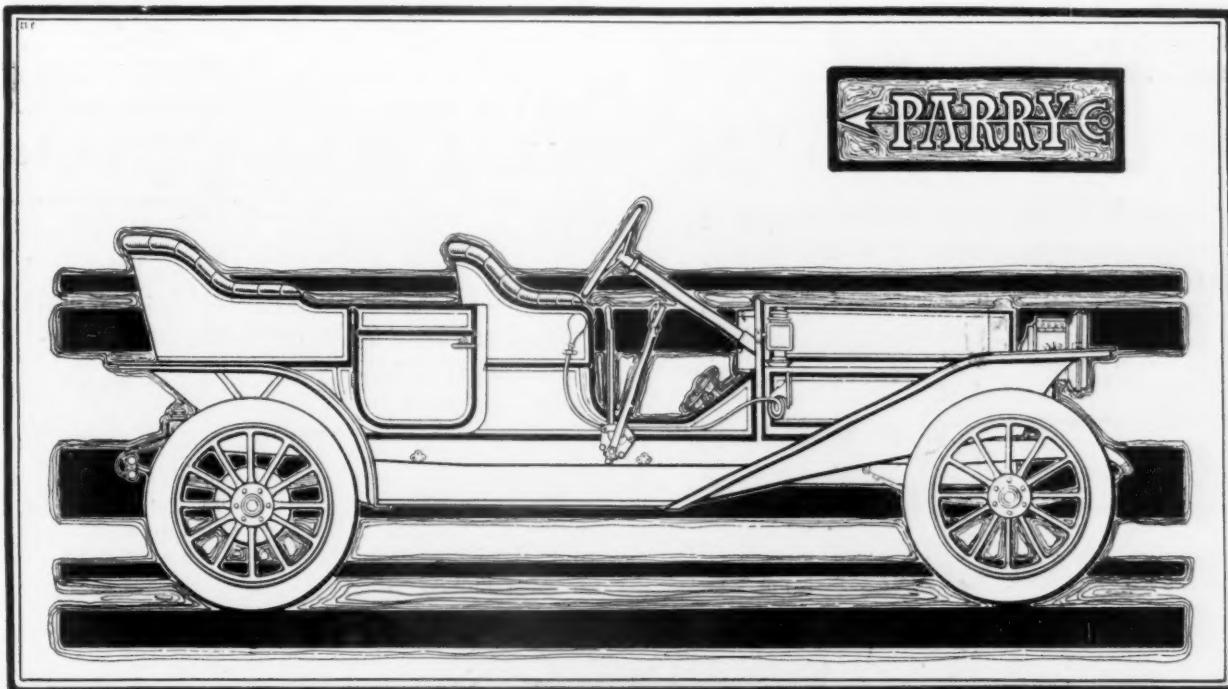
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"Parry" Touring Car, \$1,485

MOTOR—"Parry Motor," 4-cylinder, 4-cycle; cylinders cast in pairs. Bore 4½ in. Stroke 4½ in. with valves in the head.

HORSEPOWER—32 to 36.

OILING SYSTEM—Self oiling splash system with sight feed on dash.

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IGNITION—High tension magneto with reserve set of dry cells.

CARBURETOR—Built especially for this motor.

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TRANSMISSION—Sliding gear; 3-speed selective type and reverse, with H type hand control. Transmission is located in sub-frame.

REAR AXLE—housing, also housing for drive shaft of pressed steel. Axle shafts and drive shafts are made from carefully heat-treated Vanadium steel.

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BRAKES—Internal and external lined with Thermoid.

WHEEL BASE—116 inches.

WHEELS—Artillery type, quick detachable rims.

TIRES—34x3½ in.

TREAD—56 inches, standard.

SPRINGS—Semi-elliptic front; full elliptic 40-inch springs in rear, scroll ends.

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UPHOLSTERING—Rich dark leather with special spring cushions.

EQUIPMENT—One pair side oil lamps and tail lamp; one horn and set of tools.

PRICE—\$1,485 f. o. b. Indianapolis.

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Grade Car at a
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Including FULL EQUIPMENT, in Either
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Base, Dual System Ignition, Remy Mag-
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Patented Improved Carter Carburetor, with automatic air control, regulated from the dash. In tests with other leading carburetors the Carter has proven a higher efficiency and is especially adapted to the six-cylinder motor.



MINIATURE TONNEAU STANDARD SIX

There are other Sixes, but few have that Life of Quick Action and that Tenacity to Stick to and go the road with such satisfaction as the STANDARD SIX.

We have aimed to make the STANDARD SIX all that its name implies. Standardization of the motor car has arrived to stay for some time. No radical changes are contemplated by any of the large manufacturers. The STANDARD SIX has been built well along in this period of most welcome standardization of the motor car.

We are the first manufacturers to have conceded that FULL EQUIPMENT should be as much of the whole car at the selling price as the carburetor and spark plugs. Therefore, we sell the STANDARD SIX as "The Car Complete," ready for the road.

The following FULL EQUIPMENT is included in the selling price of the STANDARD SIX:

Two 12-inch DIETZ Head Lamps, with Bausch & Lomb lens.	One complete Tool Outfit.	One combination Warner Speedometer and Clock.
One Gas Generator.	One complete Tire Repair Outfit.	One Top, complete with Side Curtains.
Two Dietz side and one tail lamps.	One Tire Carrier.	One Automatic Wind Shield.
One Horn.	One Coat Rail.	
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All Stock Cars equipped with latest improved Quick Detachable Rims.

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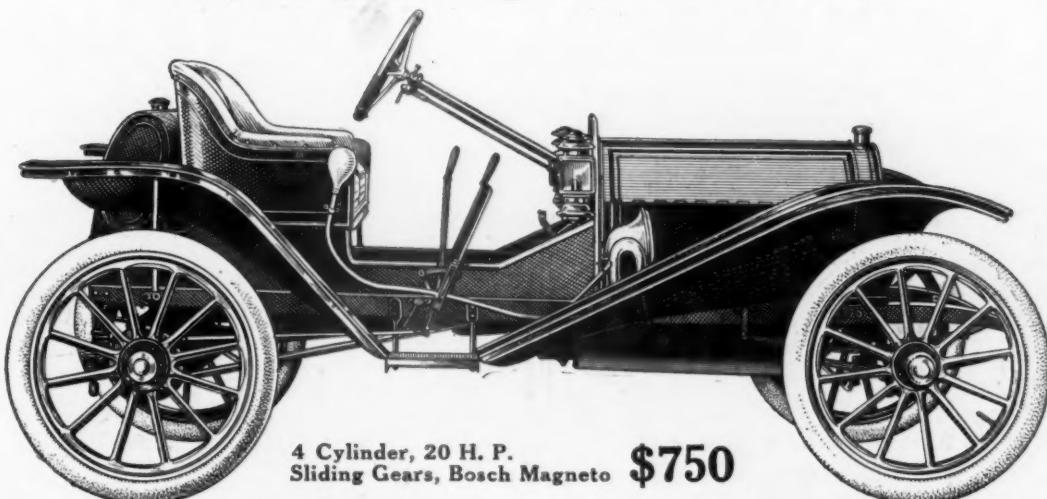
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Everything the Big Car Has Save Size



Hupmobile

Until the Hupmobile came nobody had built a little car which was just as good as the best big car made.

The man who bought a roadster or runabout knew that he wasn't getting the same sort of engineering skill, workmanship and material that he got in the fine large cars.

But the Hupmobile has changed all that.

If the makers of the best and costliest big cars in the country decided to market a moderate priced roadster, they wouldn't produce a better car than the Hupmobile—because they couldn't.

Their pride in their fine workmanship is no greater than our pride in ours.

Its 20 horsepower is not mythical—the full 20 horsepower is there whenever and wherever you want or need it.

It's a perfect little glutton for hills and high grades. You can't discourage it any more than you can discourage the finest other motor of twice the horsepower rating.

And what's true of the motor is true of every other feature in the construction.

You'll search in vain for anything inferior—for any one part in the chassis that doesn't match the same part in a costlier car in everything but size.

Where will you see a sturdier, strong, pressed steel frame, stancher axles (fit for a car twice its weight), or a more noiseless system of sliding gears?

What they give you on a large scale the Hupmobile gives you on a small scale.

It isn't a little car masquerading as a big one.

It's a small car which is just as good in every detail as the best big one.

The power plant is just as perfect.

It's not as large as some others, but if you examine it with the experienced eye of a critical engineer you won't find it one whit inferior.

It will do the uttermost that a perfect power plant can do in proportion to its size.

And what other roadster compares with it in snap, style and elegance of appearance—what big car, speaking proportionately, is more distinguished?

Success has come to the Hupmobile in overflowing measure. In every community it has hosts of friends and its appearance on the streets is followed by a chorus of admiring comments.

Ask your Hupmobile dealer to demonstrate its splendid speed, power and smooth running capacities and you'll be charmed with its performance.

And write for literature.

SPECIFICATIONS

ENGINE—4 cyl., 20 H. P., 3½ in. bore, 3¾ in. stroke; water cooled; offset crank shaft; fan bladed fly wheel in front; Parsons white bronze bearings; noiseless cam shaft.

TRANSMISSION—Selective sliding gears, shifting without noise.

CLUTCH—Multiple disc type, running in oil.

REAR AXLE—Shaft drive.

BRAKES—Two foot and two emergency (internal expanding) lined with Thermoid on rear hubs.

IGNITION—Bosch high tension magneto.

TIRES—30x3 inches.

WHEEL BASE—86 inches.

TREAD—56 inches.

SPRINGS—Semi-elliptical front, patented cross spring rear.

EQUIPMENT—Two side and tail oil lamps, dragon horn, tools, repair kit, pump.

WEIGHT—1,100 pounds, regular equipment.

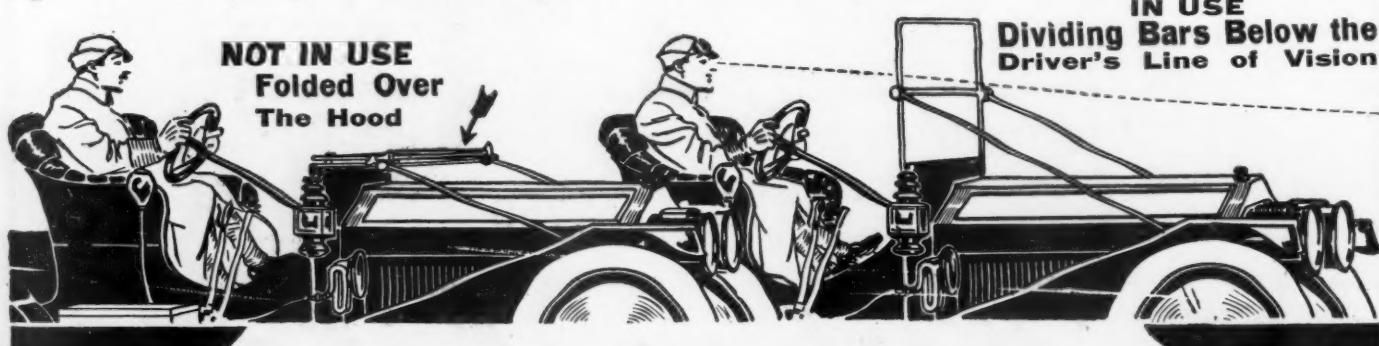
Hupp Motor Car Co.

Dept. B, Detroit, Mich.

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MOST MONEY FOR THE DEALER - MOST SATISFACTION FOR THE USER

No other wind shield has these advantages:
Up in a jiffy—down quicker, and operates with one hand.



Our New Plan Brings You Customers
WRITE FOR DETAILS

The two distinctive features—entirely out of the way when not in use and keeping the line of vision clear—lift the Universal Wind Shield above competition. All other makes suffer by comparison.

The Universal Wind Shield is rattle proof because perfectly constructed—all parts, brass highly finished. Real French Plate glass securely cushioned in the frame. Vibration entirely eliminated. The adjustment is so firm that the roughest roads don't affect this shield—it stays put.

You can't buy a Universal without the life-long anti-rattle, perfect construction guarantee.

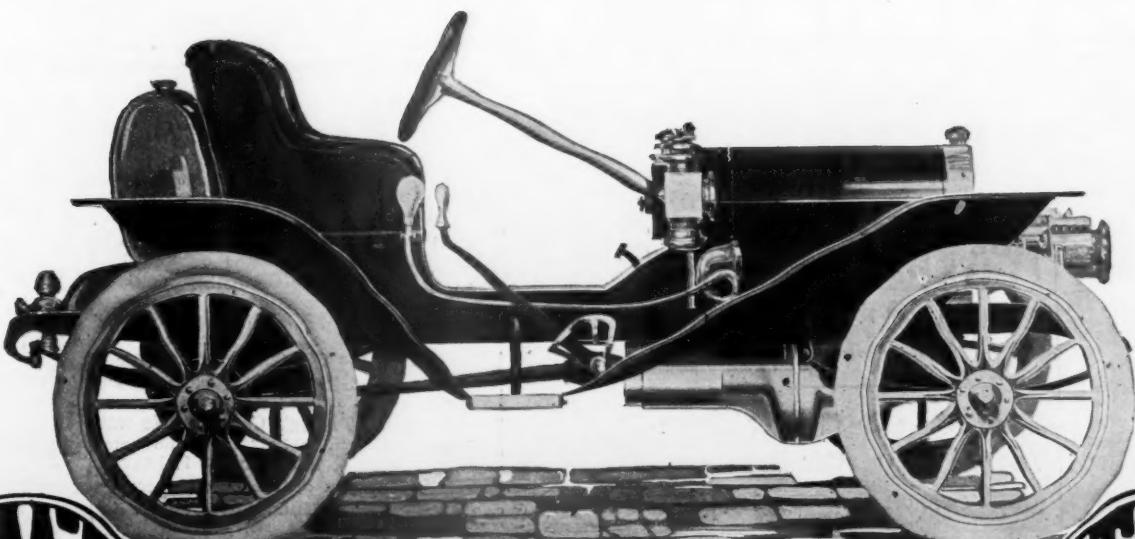
The Universal Wind Shield is the most profitable accessory you can handle. It is made in styles and sizes to fit all conditions and every car. It is the most satisfactory wind shield on the market.

We bring customers to our dealers—our new plan means big sales of Universal Wind Shields in your Section.

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**THE CAR THAT FILLS A UNIVERSAL
NEED**

AN AUTOMOBILE, NOT AN IMITATION for

**MAGNETO
INCLUDED \$550 FULLY
EQUIPPED**

"The Aristocratic Runabout at the Poor Man's Price"

As the result of our very first announcement more than half our year's product already asked for. The demand will certainly exceed the supply.

SPECIFICATIONS:

MOTOR—2-cylinder, double opposed, 8-10 H.P., water-cooled.
TRANSMISSION—Planetary, selective type.
REAR AXLE—Shaft drive, Hyatt roller bearings.
FRONT AXLE—Drop forge.
FRAME—Pressed steel.
WHEELS—Artillery, with 30x3-inch standard clincher tires.
WHEEL BASE—80 inches.
STEERING GEAR—Irreversible type.

CARBURETOR—Floating ball type, metal float, jacketed intake pipe.
IGNITION—High grade magneto, and dry cell.
SPRINGS—Semi-elliptical front and rear.
EQUIPMENT—Two side and one tall oil lamps, dragon horn, tire repair and tool kits.
WEIGHT—800 lbs., with regular equipment.
PRICE—\$550, f. o. b. Detroit.

THE SENSATION OF THE SEASON, produced by an organization of old, experienced automobile men, who have been getting ready for over a year. We are now properly equipped to make 3000 cars this season and we're going to make them.

DEMOTCAR SALES CO., Detroit, Mich.

RUSHMORE**TWO KILLED IN AUTO
AFTER BALLOON HUNT**

**Edward Baker and Parker Norton
Thrown Out as Car Hits Tele-
graph Pole on Jericho Turnpike.**

TRY TO PASS CART IN DARK

**They Had Picked Up Leo Stevens's
Balloon, After Its Successful
Flight from Manhattan.**

Special to The New York Times.
MINEOLA, L. I., Sept. 29.—Edward Baker, proprietor of the Mineola Garage, and Parker Norton, owner of The Mineola Press, were instantly killed to-night as the automobile, in which they were bringing the balloon of Leo Stevens back to Krug's Hotel here from Hicksville, crashed into a telegraph pole in the Jericho Turnpike about a mile and a quarter from here. William Watson, who was driving the car, escaped with slight injuries.

The accident occurred at about 10 o'clock. Watson had volunteered to A. R. Pardington, manager of the Motor Parkway, to follow Stevens's balloon, the Stevens No. 24, and after it had been packed, to bring it to Krug's Hotel to be stored. Pardington also agreed to follow the balloon in his own machine.

The accident happened at a good ~~part~~ ~~good~~ ~~part~~ ~~of time~~, and it was well along in the evening when Mr. Pardington and the aeronauts reached the hotel. They had not driven fast, and Mr. Pardington had half expected to find Baker and his friends awaiting him. They were not there, however,

As the minutes passed Mr. Pardington became uneasy and at last ordered his car out, ~~and getting into the driving~~

He ran up the Old Country Road for a considerable distance and finally turned down into the Jericho Turnpike and started back toward Krug's Corners. He was about a mile and a half from the hotel and at this point the Turnpike is heavily overhung with an arcade of old trees.

Pardington Finds the Wreck.

Although there was a full moon, its rays could not penetrate their foliage. The roadway was shrouded in complete darkness, except where the double rays of Pardington's gas headlights threw a funnel-shaped glow into the dark.

Opposite the home of George B. Titus, ~~however~~, the searchlights revealed the wreck of an automobile heaped about a telegraph pole.

Mr. Pardington jammed on his brakes and leaped from the car. Before him he saw the wreck of Baker's car, to which the balloon was still attached. Near it on the ground lay Baker, dead with a broken neck, and not far away was the body of Norton, whose skull had been fractured. On a hummock of grass beside the road sat Watson, his head in his hands, almost overwhelmed by emotion at the death of his friends.

Watson, whose cuts and bruises were dressed by Dr. Cleghorn, said that the accident had happened through his effort to avoid a wagon which suddenly appeared in the road almost directly ahead of them. In the darkness the motorists did not see the wagon until their headlights were almost under its tail. Then Watson swung his steering wheel around and tried to get past. He was too near the side of the road, however, and the automobile was driven into the ditch.

Directly in front of them rose the telegraph pole, and according to Watson, Baker reached for the steering wheel, apparently made too nervous by his danger to realize what he was doing. The car crashed into the pole with fearful force, and all three of the men were thrown out.

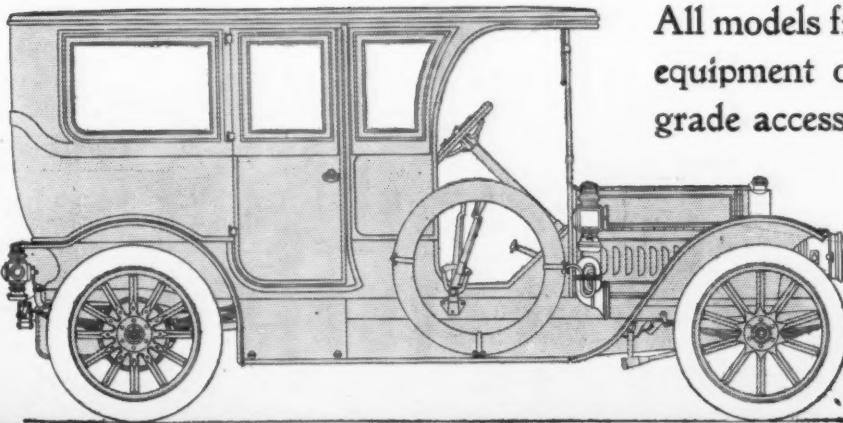
— motorists who use
Rushmore Searchlights
see the wagons before they hit them

RUSHMORE DYNAMO WORKS PLAINFIELD, N. J., U.S.A.—
LONDON, PARIS, CHICAGO

RUSHMORE

A car of good, wholesome, standard design, built along approved lines of the best material and workmanship.

Nothing Radical



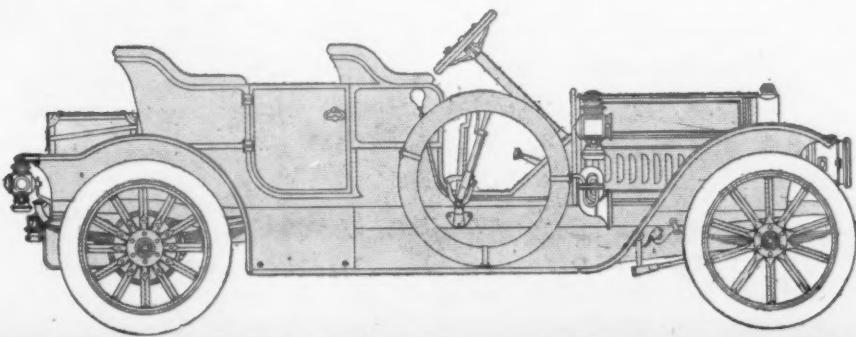
All models fitted with standard equipment of lamps and high grade accessories

Nothing Freakish

Croxton-Keeton Cars

Not a new car, but the well-known Jewel Cars transformed. Many improvements in design and refinements in looks have been added.

Chrome Vanadium steel is used throughout in the selective gearset and imported annular ball bearings carry both gearset shafts. In the rear platform springs as well as in the front springs, Krupp's Imported Silica Manganese Steel is used. The dual Bosch ignition system is employed and self-contained oiling systems are used throughout. The clutch is a special cone and cork inserts. Timken adjustable roller bearings are used in the front and rear wheels, rear axles, and on the steering knuckles. Throughout the car, only the best materials are used. 1910 catalog will be mailed upon request.



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Get an Emergency to carry with your present Main Battery.



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Write for the Name of the Distributor nearest you.

1888
1909

The 1910 LEXINGTON

A MIGHTY GOOD CAR

ELEGANCE, EFFICIENCY and ECONOMY Combined

THREE MODELS

5 or 7 passenger
TOURING

4 passenger
SHORT-COUPLED

2 passenger
ROADSTER
with RUMBLE



"Try to Get One"

ANY
MODEL

\$2500

We conservatively claim
to give

**THE MOST
GENEROUS
VALUE** ever offered

We do not promise a \$6,000 value for \$2,500, but we are ready to convince any prospective car buyer or dealer that we manufacture the best constructed and most efficient all-round car that was ever sold for \$2,500, and perhaps for \$3,500. The 1910 LEXINGTON is so elegant as to be the pride of any motorist, and so economical as to surprise any buyer.

THE LEXINGTON MOTOR CAR COMPANY, Inc.
LEXINGTON, KENTUCKY

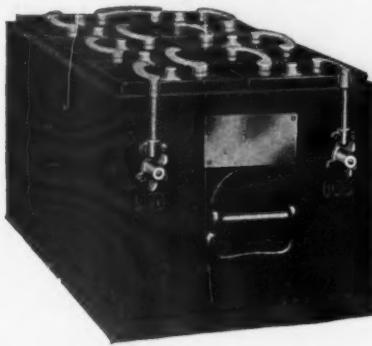
A Tip to Dealers—Ask about the New \$1650 Models—We will commence delivering next month

PLANT OF THE ELECTRIC STORAGE BATTERY CO.



Output in the United States larger than all others combined many times over. Quality and Quantity are Interdependent.

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Leads Because it Lasts

A Long Life Makes the Price Low

Used in over 90% of all Electric Vehicles manufactured. Costs the Vehicle Manufacturer more, but an Electric Vehicle with the "Exide" costs Dealer and User the same price as when other batteries are substituted.

Prompt delivery from large stocks in Philadelphia, Boston, Cleveland,
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660 Distributors Throughout the United States. Write for the Name of the Distributor nearest you.

1888
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See our "Exide" Sparking Battery Advertisement at the top of opposite page

HIGH GRADE AXLES FOR MOTOR CARS

Because a car is equipped with Timken Roller Bearing axles is no reason why it should be accepted as a good car, but a great many people do accept it as such.

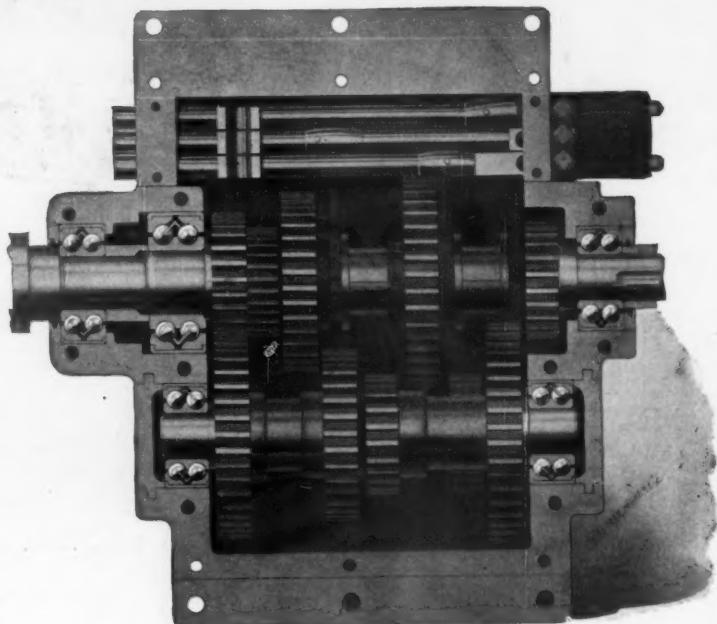
They figure that a manufacturer who insists on axles of Timken Quality is not likely to skimp his car at any other vital point.

THE TIMKEN-DETROIT AXLE CO.

NEW DEPARTURE TWO-IN-ONE ANNULAR Ball Bearings

Are Extensively Used in
Transmission of 1910 Models

Automobile manufacturers find New Departure well adapted for conditions here because of its superior capacity for carrying radial load and its longer life.



NEW DEPARTURE is a guaranteed bearing. This guarantee is based upon accuracy of manufacture, material and careful inspection of finished product by a corps of experts.

Catalogue—Treatise on Request

The New Departure Manufacturing Company, :: Bristol, Conn.

The "BIG NOISE" in
the Automobile Trade



plugs are **selling faster** and are giving better results than any other plug heretofore introduced.

These are facts easily proven by asking dealers how they sell, and owners how they perform.

Get in line for big sales and big profits.

All Sizes, All Styles, Porcelain or Mica, \$1.00

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\$650

"The Right Car at the Right Price"

\$650

DETAMBLE

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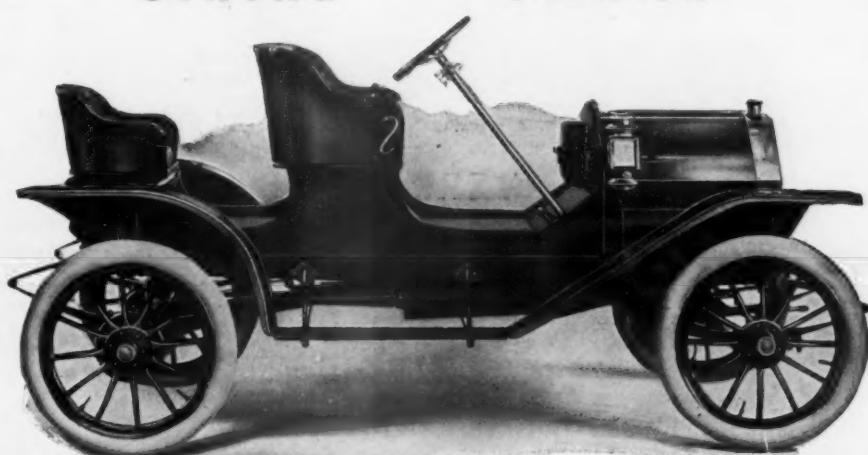
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16 H. P.

90 in. Wheel
Base

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ford Tires

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(Sure)



A
REAL
AUTO-
MOBILE
FOR
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\$650

Add a Second Rumble Seat and Make a Four Passenger Car
DE TAMBLE SALES CO.
1256 Michigan Ave. CHICAGO, ILL.

\$650

MUNSEY RUN ALSO MARKS THE PRE-EMINENCE OF **Diamond** TIRES

In the Munsey Run Diamond Tires equipped more cars than any other three makes combined— $12\frac{1}{2}$ sets of Diamond tires against 5 sets of the second highest make. Ten well known makes were represented. No Diamond tires were furnished without charge.

Eighteen cars finished the run. Diamond tires equipped 8 of them—more than any other three makes combined. Not one car entered with Diamond equipment was seriously delayed or lost either points or place, on account of tire troubles.

With a general average of very bad roads Diamond Tires still showed a very low mileage cost, their superior record in this respect being in fact a notable feature of the run. It practically duplicated the Pathfinding trip for the Munsey Run, when the route was marked on Diamond tires, one puncture being the total tire trouble in the 1,300 miles.

KANSAS CITY STAR CUP

Won by a Cadillac on Diamond tires in the reliability run to Omaha and return, and Diamond tires also equipped the principal number of all cars participating.

THE DIAMOND RUBBER CO.

AKRON, OHIO.



THIS IS THE TERMINAL YOU SHOULD USE

Show the same care in the selection of your Terminals as you do in selecting more important accessories. The

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QUICK
DETACHABLE
TERMINAL

Fills a long-felt want. It is neat, handsome in finish, reliable and efficient. It is made up in two types suitable for use as a Primary or Secondary connector. Safe to handle—no opportunity to receive a shock. Quick and easy of attachment.

Write for 1910 Catalog

**CONNECTICUT IGNITION DEPARTMENT
UNITED MANUFACTURERS, INC.**

Broadway and 76th Street, New York

PHILADELPHIA—422 Commerce Street
CHICAGO—1430 Michigan Avenue
BOSTON—109 Massachusetts Avenue
CLEVELAND—1932 Euclid Avenue

DETROIT—225 Jefferson Avenue
SAN FRANCISCO, CAL.—Hughson & Merton,
544 Van Ness Avenue





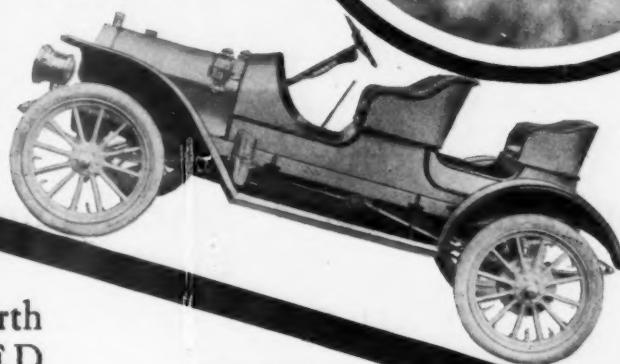
MASON

**"The HILL-CLIMBER"
The CAR that DOES THINGS**

The Inexpensive Car that
travels in the Big Car Class.

**24-28 H. P.
Touring Car \$1350**

This Style
Tourabout
\$1250



At Algonquin
Winning
Everything
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Highest
Percentage
Efficiency
7.85

On the GLIDDEN TOUR

MASON IS THE

greatest Hill-Climber on earth
for the PRICE ASKED

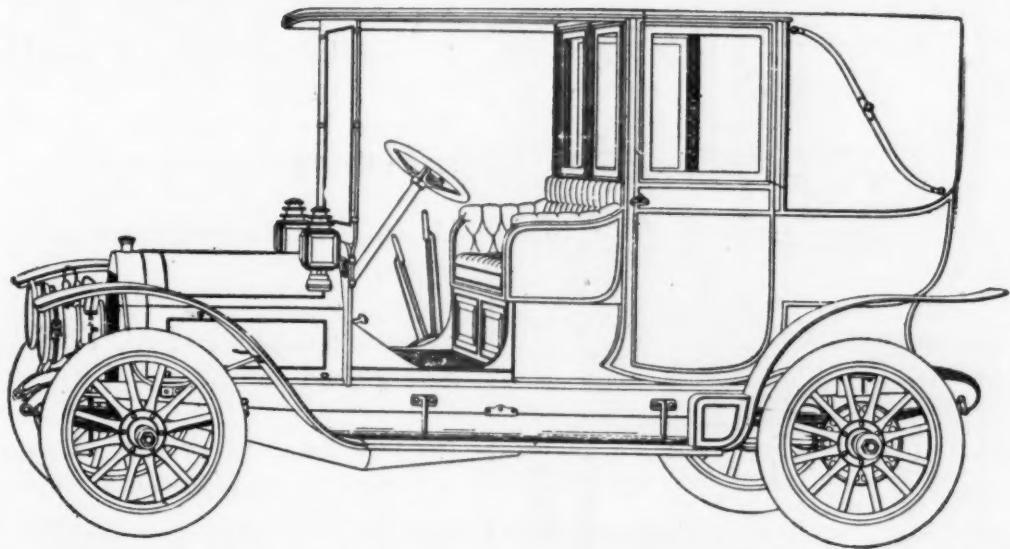
And great in other respects as well

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CATALOG

MASON AUTOMOBILE CO., Des Moines, Iowa

James Cunningham, Son & Company

COACH BUILDERS

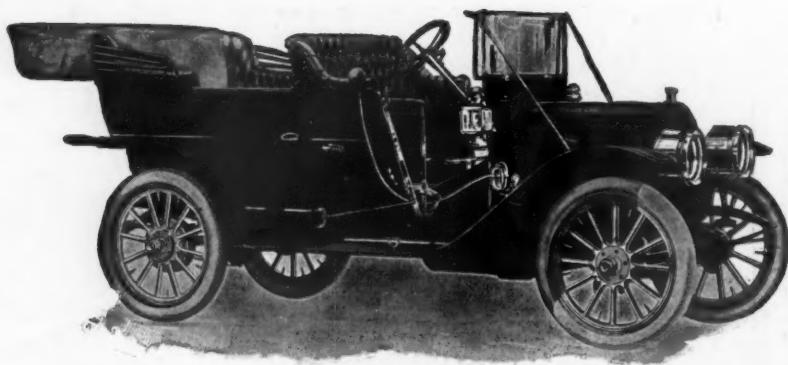


For more than seventy years we have been building coach work of dependable quality. We are now engaged in building bodies for motor carriages and are prepared to do so in a prompt and efficient manner. **THE QUALITY** will be the same as has enabled us to build up the largest coach business in America, and our prices will be most reasonable because we have the capital and facilities to do this kind of work at less cost than many, not equipped so favorably. Let us show you designs.

JAMES CUNNINGHAM, SON & CO., Rochester, N. Y.
557 WABASH AVENUE, CHICAGO, ILLINOIS

Dorris

Model E 1910



PRICE \$2500 FULLY EQUIPPED WITH

Top and Dust Cover
Speedometer

Five Lamps
Prest-O-Lite Tank

Tools
Tire Holders

ALL BRASS FOLDING WIND SHIELD

DORRIS MOTOR CAR CO. St. Louis, Mo.



"GET ME AN
AUTEX SPARKING BATTERY
I'M GOING TO WIN THIS RACE"

Why does the experienced driver, determined to win a big race, insist on having an AUTEX battery?

Because he can *depend* on an AUTEX.

Because he *knows* that an AUTEX will stand the test of severest service.

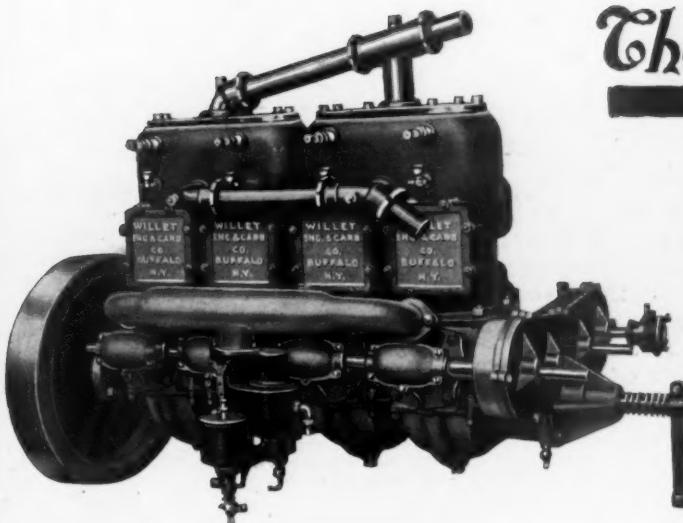
Because the Company behind it has a reputation.

Because thousands of AUTEX batteries are giving good service.

Because he must be *sure* of getting a good hot spark every time—and an AUTEX will give it.

MANUFACTURED BY
THE WILLARD STORAGE BATTERY CO.
CLEVELAND, OHIO

New York Branch—1876 Broadway
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Agencies in all large cities in U. S. and Canada



The WILLET TWO-CYCLE ENGINE

is a revelation even to the two-cycle advocate. For power, flexibility, efficiency, simplicity, and smooth running it has no equal. Our patented Rotary Intake Valve and the Counterbalancing makes the Willet engine superior in every way. Simple in construction, silent in running and inexpensive in upkeep. All engines are fitted with our make of Multiple Jet Carburetors.

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DIETZ

Dietz "HANDY" Generators are by far the best method ever devised for producing pure brilliant white Acetylene Gas for Motor Car Lamp lighting. They cannot get out of order, there being but four principal parts without any delicate mechanism. Operation is absolute and economical.

We make two styles and three sizes. Write us for full details and prices and at the same time to send you a catalog of our line of world-famous Motor Car Lamps for Oil, Gas and Electric lighting.

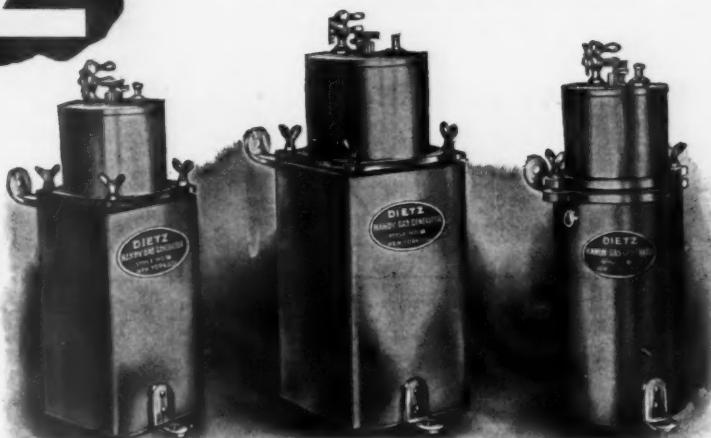
Write for it NOW while you have it in mind.

R. E. DIETZ COMPANY
60 LAIGHT STREET, NEW YORK

870 WOODWARD AVE., DETROIT
Established 1840

118 HOLBORN, E. C., LONDON
Pioneers in the Motor Car Lamp Industry.

"HANDY" ACETYLENE GAS GENERATORS



DIETZ
MOTORCAR
LAMPS

BENFORD'S "MONARCH" MAGNETO PLUG

A Thoroughbred Magneto Plug, not an adaptation of an old style coil plug.

A Futurity Winner, for it is sired by Experience and its dam is Knowledge—a complete knowledge of the requirements of perfect ignition. This plug meets every requirement fully and completely—

Most Powerful, Dependable and Durable of any plug made.

The construction of the firing points make it impossible to miss fire under any condition.

The insulation or core is twice the thickness of the ordinary Mica Plug, so that the heat, oil and extreme high tension of a Magneto cannot have any ill effect upon it or break down its insulation. Made especially for high powered cars.

Distributing Agencies: Bi-Motor Equipment Co., Boston, Mass.; New York Sporting Goods Co., New York City, N. Y.; Geo. W. Nock & Co., Philadelphia, Pa.; Waite Auto Supply Co., Providence, R. I.; Beckley Ralston Co., Chicago, Ill.; Automobile Supply Co., Chicago, Ill.; Julius Andrae & Sons Co., Milwaukee, Wis.; Minneapolis Electric Motor Co., Minneapolis, Minn.; Motor Specialty Co., Detroit, Mich.; Behen-Faught Motor Car Equipment Co., St. Louis, Mo.; Moore Motor Supply Co., San Francisco, Cal.; Kansas City Auto Supply Co., Kansas City, Mo.; Elvey-Austell Co., Atlanta, Ga.; Bell Motor Co., Norfolk, Va.; Interstate Electric Co., New Orleans, La.; Rochester Rubber Co., Rochester, N. Y.; Iroquois Rubber Co., Buffalo, N. Y.; Syracuse Rubber Co., Syracuse, N. Y.; Baum Iron Co., Omaha, Neb.

Auto Manufacturers and Dealers,
Write To Us To-day for Trade Discounts.

E. M. BENFORD MFG. CO.
100 Pearl St., Mount Vernon, N. Y.

"Monarch" Magneto

Price, \$1.50

TIMKEN QUALITY

AT ANY ANGLE • WITHOUT FRICTION

**The New Series Timken Short Bearings
WILL CARRY THE LOAD WITH EQUAL EFFICIENCY**

These Short Bearings are especially designed to be used on any Axle where Annular Ball Bearing can be used. They have a greater carrying capacity than Annular Bearings of the same length—though smaller in diameter, will carry a greater load and take as much END THRUST as RADIAL LOAD. These New Short Bearings are made from best Nickel Steel to the TIMKEN Analysis chemically, each piece being tested physically to the TIMKEN Standard. And have demonstrated again that

The Timken Principle is Correct, and The Timken Quality is Supreme

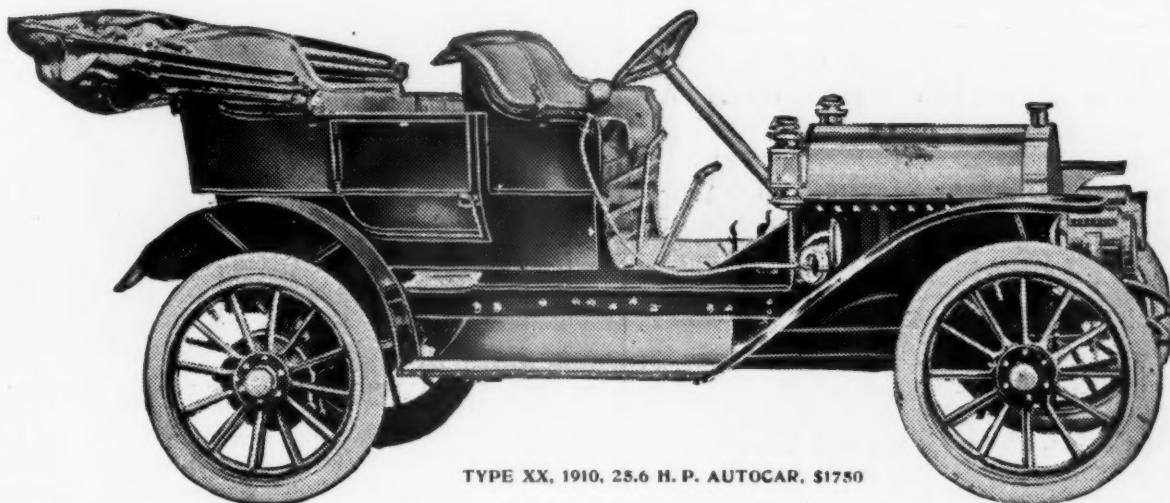
Over 70% of the makers of High Grade Automobiles and 70% of the Commercial Truck builders of this country use **Timken Roller Bearings**

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THE TIMKEN ROLLER BEARING CO., CANTON OHIO
10 E. 31st Street, New York City BRANCHES 429 Wabash Avenue, Chicago

The Autocar

1910 TYPE XX \$1750.00



TYPE XX, 1910, 25.6 H. P. AUTOCAR, \$1750

Four Cylinders, 4" x 4 1-2" I Beam Front Axle Semi-Floating Rear Axle Bosch Magneto—Dual System 34" Wheels
Five Lamps and Generator Universal Rims Adjustable Taper Roller Bearings Throughout

We have good territory open for dealers

Write for catalogue and information

THE AUTOCAR COMPANY,

Ardmore, Pa.



This Is Neither **COOK nor PEARY**

It's just an everyday Motorist who has discovered the only automobile lubricants which will stand extremes of temperature and do their work perfectly.

If there were a boulevard to the Pole



could be relied upon to lubricate your car there and back and on to the equator. **It's pure enough to eat!** The impure ingredients of automobile greases account for the rattle-bang condition of bearings in many otherwise good cars. The decomposed fats in lubricating greases eat away bearing surfaces, melt in the heat of summer, freeze up in winter—cause untold injury rather than lubricate and prevent wear.

If you care what your machine is worth a year from now, clean out all the grease and apply **Non-Fluid Oils** in your gear case, differential, pump, axles, etc. It's cleaner, more durable and much cheaper in the end.

Ask your dealer or return us attached coupon for free samples. Address Dept. E.

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Sales Agents, **UNITED MANUFACTURERS**, Broadway at 76th St., New York

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The Bowden Patent Wire Mechanism

FOR THE TRANSMISSION OF RECIPROCATING MOTION THROUGH A FLEXIBLE AND TORTUOUS ROUTE

THE Bowden Wire Mechanism is particularly adapted for Motor Car, Motor Cycle, Motor Boat and Airship service, as follows: For

Brakes for Cycles, Motor Cycles

Brakes for Motor Cars, Light or Heavy

Valve Lifters for Motor Cycles

Ignition and Throttle Controls for Motor Cars, Motor Cycles, Motor Boats and Airships

Carbureter Ticklers

Sprags for Motor Cars

Muffler Cut-Outs for Motor Cars, Motor Cycles, Motor Boats and Airships

Auxiliary Air Controls for Motor Cars, Etc.

Solarclip Gas Lamp Shades.

What it is.—The Bowden Wire Mechanism consists of but two parts—a closely coiled and practically incompressible spiral wire, constituting what is termed "the outer member," and a wire cable, practically inextensible, threaded through the above, and termed "the inner member."

What it does.—Previous to the introduction of the Bowden Mechanism the usual mechanical method of transmitting power in other than a straight line was by means of angle levers and rods, cables and pulleys, and other such devices, all of which necessarily involve considerable complication, besides increased labor and expense in adapting them satisfactorily to the user's requirements. The Bowden Wire Mechanism dispenses with all these difficulties, while enabling power to be transmitted by the most tortuous route. The mechanism is complete in itself, and requires only that one member shall be anchored to a stop at each end, and that the other member shall be attached to an operating lever at one end and to the object to be moved at the other.

¶ The opportunities for the use of the Bowden Wire Mechanism are practically unlimited, and in every case its employment is accompanied by decreased cost of actuating mechanism, simplicity, instantaneous operation of actuated parts (due to absolute lack of lost motion) and reliability.

¶ The Bowden Wire Mechanism may be adapted to impart either a **pulling** or **pushing** movement.

OVER TWO MILLION FEET SOLD ANNUALLY

J.S. BRETZ COMPANY

sole importers, TIMES BUILDING, NEW YORK

Also U. & H. The Master Magnets; F. & S. Bearings; Hartford Universal Joints; German Steel Balls

S & W AUTO CRANK

CONVENIENCE - SATISFACTION

are the result of using the S & W AUTO-CRANK. A child can turn the crank. Ladies can drive a car so equipped. Avoid the danger of cranking (37 % of accidents to drivers and passengers are due to cranking). The S & W attachment is simple, easily attached, and positive in its operation. Let us tell you more about it.

STRYKER & WOESSNER, Huron, Ohio

ROADS ARE ROUGHER

in Winter than in Summer

and the automobile owner who has the forethought to possess an umbrella for rainy weather, or an ulster coat for cold weather (both being conducive to comfort), will likewise equip his car with a set of

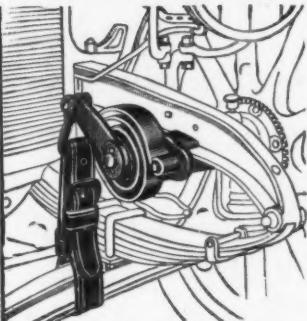
Skinner Recoil Checks

They do wonders in the way of smoothing out the rough roads and lead straight to comfort when the going would otherwise be rough.

There are many devices which aim to do what Skinner Does Do.

SKINNER & SKINNER COMPANY

Manufacturers
1427 Michigan Ave. CHICAGO



FOR SALE BY THE LEADING JOBBERS
Alamo Auto Co., San Antonio, Texas.
Standard Auto Sup. Co., Chicago.
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Pennsylvania Rubber & Supply Co., Cleveland, O.
Auto Equipment Co., Denver.
Omaha Rubber Co., Omaha.
Western Auto Sup. Co., Omaha.
Southwestern Auto Sup. Co., Dallas.
Jenkins Specialty Co., Sumter, S. C.
Gibbs Machinery Co., Columbia, S. C.
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D. Fenstermacher, Minneapolis.

Two More Big AJAX TIRE Triumphs

**1,282 Miles on the Munsey Run
With Only One Puncture!**

Read This Telegram:

Washington, D. C., Sept. 30.
 Horace De Lisser,
 Pres. Ajax-Grieb Rubber Co., N. Y.
 Want to congratulate you on best tire record
 in Munsey Run. I had one puncture on AJAX TIRES
 on entire run.
 H. F. WALLS,
 Driver Official Car (Maxwell).

In Class 5 event of the
Long Island Stock Car Derby

on the Riverhead-Mattituck course, Sept. 29th, Arthur See in a Maxwell won, driving 91 miles in 101 minutes, 22 seconds, at the rate of 54 miles an hour. Thomas Costello in a Maxwell was second, and Dooley in a Maxwell was fourth—all 3 cars equipped with AJAX TIRES.

All 12 tires were in excellent condition at the finish of the race. These were the same tires on which the 3 cars were driven from the Maxwell factory at Tarrytown, N. Y., and on which the practice trials, before the race, took place. Not only were they not changed for the contest, but after the race was over the same tires carried the 3 cars back to the factory.

Not a puncture, not a blow-out, no repumping of air—no tire trouble of any kind whatsoever!

**No Other Tire in the World
Has Ever Equaled This Record**

AJAX TIRES are guaranteed for 5,000 miles or 200 Days' Service. Write for a copy of the guarantee.

Ajax-Grieb Rubber Company

Chicago, 1425 Michigan Ave. Minneapolis, 905 First Ave. South
Kansas City, 1422 Grand Ave.

FACTORIES, TRENTON, N. J.

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There May Be Some Doubt

about the discovery of the North Pole by

COOK and PEARY

But there can be no doubt whatsoever that Eisemann discovered the Magnetic Pole when he invented the

Eisemann High Tension Magneto

The Simplest, Surest, Most Serviceable Ignition System known. Used on the Highest-Powered, Highest-Quality Motor Cars in the World.

PEARY

Ask us to tell you more about this Remarkable Magneto.

COOK

LAVALETTE
& CO.

112-114 W. 42D ST.,

NEW YORK



**More Baker Electrics Are
Sold Each Year Than Of
All Other Makes Combined**

The Baker gives more mileage and greater efficiency, with less trouble and less expense, than any other electric.

Baker Agents have a monopoly of the best patronage in their locality.

They have more to offer their customers than dealers handling other electrics—they have no competition.

Because Baker Electrics have more mileage—more speed—more service and longer life—than any other electrics, at a lower cost of maintenance.

When you sell a Baker Electric, you sell a car that performs what others "claim"—you sell a car which for years has been

The World's Standard

The car by which all other electrics are judged—A car that is built for continuous service—not for "stunts."

A silent performer for every day in the year—A car built by experts in the largest and most up-to-date factory in the world, devoted exclusively to the building of electric automobiles.

Lest You Regret

If we are not represented in your city WRITE AT ONCE. Our new 1910 models include Coupes, Runabouts, Victorias, Broughams, Roadsters, etc.

The Baker Motor Vehicle Co.

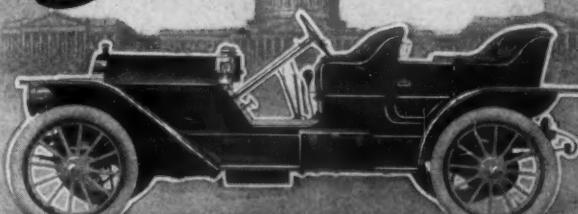
30 West 80th St.

Cleveland, Ohio.

When Writing to Advertisers, Please Mention Motor Age.

\$2,500

National
"40"



A High-Powered Car of Class

**A Timely Word
To The Dealer**

An enormous number of cheap cars were sold for 1909. Their owners will get along with them through the winter; then the same old story—they know enough to want real cars.

Are you prepared to meet that demand?

You'll need high-grade cars and you'll want the best bargain of the year. Read the specifications, bearing in mind that this car does better than a mile a minute and is built with all the National nicety of workmanship and you'll know which of the high-grade cars of known reputation will be the big seller.

The time to arrange for your allotment is now.

Partial Specifications.

Motor—Four cylinders, 5x5-11/16 inches vertical, cast in pairs. Water cooled; centrifugal pump. **Clutch**—Self-contained aluminum, cone leather faced, spring cushioned. **Transmission**—Sliding gear, selective type. Three speeds forward and reverse. **Wheel Base**—124 inches. **Drive**—Bevel gear, through propeller shaft. **Oiling**—Crank case, constant level force feed oiler, oiling all working parts of motor. **Ignition**—Two separate complete systems. One gear-driven, high-tension Bosch magneto. The other a storage battery, single coil and distributor. Each system has a separate set of spark plugs. **Tires**—36x4. **Gasoline Capacity**—17 gallons. **Brakes**—Two systems. Two internal expanding metal to metal hub brakes and two hand brakes on outside of rear wheel drums. **Front Axle**—I-beam steel forging. **Rear Axle**—Compound construction; inner axle used only as a driver. **Body**—Straight line. Carrying capacity, five passengers. **Springs**—Half elliptic, 40-inch front under frame, 48-inch rear, $\frac{3}{4}$ scroll elliptic. **Price**—\$2,500.

National Sixes.

"Fifty"—Six Cylinders, $4\frac{1}{2} \times 4\frac{1}{4}$ —\$4,200. "Sixty"—Six Cylinders, 5x5—\$5,000. **Type of Body**—Touring, Baby Tonneau or Roadster—optional on all National Cars.

National Motor Vehicle Co.
1006 E. 22d St. Indianapolis, Ind.

Standard Mfrs. A. M. C. M. A.

"COMET"



SPARK PLUGS ARE \$1.25

G-Q-D

NOTICE!

To the Trade

The Oakes & Dow Co., Boston, Mass., have a **COPYRIGHT** on the name

"COMET"

used in connection with Spark Plugs granted Dec. 8, 1908, No. 73,377.

The pronounced **SUCCESS** of

Comet Plugs

has led Pirates and Infringers to attempt to trade on **"COMET" Reputation**. We hereby give notice that any firm using the name **"COMET"** in connection with Spark Plugs will be **PROSECUTED TO THE FULL EXTENT OF THE LAW**.

Get the original. See that the **"COMET"** is stamped on the plug.

OAKES & DOW CO.
15 Chardon Street
Boston, Mass.



SOOTLESS

Matheson



Rebuilt Car Bargains

Demonstrations by Appointment.

Touring Car, Quinby body, 50 h.p., 4 cyl., \$3,250
(Original cost was \$5,650).

Demi-Limousine, Quinby body, 50 h.p., 4 cyl., \$3,500
(Original cost was \$6,500).

Touring Car, Moore-Munger body, 35 h.p., 4 cyl., \$2,250
(Original cost was \$4,650).

Touring Car, Springfield body, 60 h.p., 4 cyl., \$4,000
(Original cost was \$7,500).

The above cars are fully equipped with tops, slip covers, lamps, gas tanks, tire carriers, baggage racks, foot rails, coat rails, spare parts, &c., and have in every way the appearance and mechanical excellence of brand new cars. They are almost duplicates of our 1910 models.

Matheson cars never get in a really second hand condition. For the past three years the average repair expense per each Matheson car per 12,840 miles travelled has been only \$36.40. This means mechanical superiority and quality, quality, quality. After we rebuild a Matheson car we guarantee it exactly the same as a new car. You may buy a used Matheson, rebuilt by us, with confidence that it will give you the same term of perfect service as a new car. We do not know of any other car of which this can be said.

Also, immediate delivery of NEW 1910 Four and Six Cylinder Mathesons.

Matheson Automobile Company
1886-1888 Broadway
Salesroom, Garage and Repair Depts.
New York City



That's The Point Of Superiority

Many shields are alike—
so much brass, so much glass—all more
or less complicated or risky to
operate. In

The Hydraulic
is embodied a feature that places it in a class
by itself—the hydraulic action—exclusive in
this shield. You start the upper section with one
finger and the pistons at either end raise or lower the
shield—smoothly and noiselessly. It works like
a door check and there never is any danger of break-
age of glass, if the pumps are filled with oil. The
HYDRAULIC is always ready for the sudden gust
of wind or cloud of dust—no bolts or nuts to adjust.

Notwithstanding its infinite superiority, the
HYDRAULIC costs no more than ordinary shields.

Get the greatest value, \$30, including all
fittings.

Write for catalog "M. A."

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Veeder

TACHODOMETERS FOR AUTOMOBILES

**The Best
Speed
Indicators
In the
WORLD**

Write for Information
about them

THE VEEDER MFG. CO., 25 SARGEANT ST., HARTFORD, CONN.
Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Die Castings.

THE OBJECT

of this advertisement is to bring, once again,
to the minds of Selling Agents who contem-
plate taking on the

1910



LINE

The Necessity for Acting Quickly

The output of our factory is not yet con-
tracted for, but, at the present rate, it very
soon will be. ¶ There are months for regret
but only a few days for

ACTION THAT WILL BRING RESULTS

KNOX AUTOMOBILE COMPANY

"Winners of Contests and Customers"

Members A. L. A. M.

SPRINGFIELD, MASS.

FEDDERS Honeycomb Radiators



Cool such cars as the Pierce, Thomas, Packard Runabout and National '08. How about your order? If you want a **Real Cooler**, write us.

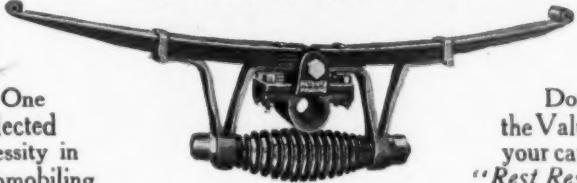
Our New Catalog Is Now Ready

FEDDERS MFG. WORKS, BUFFALO,
N. Y.

Koehler's Never Break Cantilever Springs

THE LADIES' FRIEND

The One
Neglected
Necessity in
Automobiling



Doubles
the Value of
your car as a
"Rest Resort"

Why spend all your money for repairs when you can use
Koehler's Never Break Cantilever Springs
and have a balance for other pleasure?

**The
Reason**
Doubles the life of pneumatic tires, also engine and machinery and reduces repair bills to a minimum. Makes it possible to use solid tires with as much comfort as you are now getting on properly inflated pneumatics.

Open territory for hustling salesmen. Must be financially responsible.

For further information apply to

F. J. STEINER, Manager of Sales

UNIVERSAL AUTO SPRING COMPANY
ST. LOUIS, U. S. A.

Saves
 $\frac{1}{3}$
**The Cost
of Your Car**

Perfect lubrication—the kind you get from Vacuum MOBIL-OIL—will run your car a third longer and at a third less expense than if you merely trust to "lubrication," the common, careless, chance-taking kind.

**VACUUM
MOBIL-OIL**

is made in six different grades, one of which is made for your particular car. It saves you expense and experiment. It protects your car from friction, the hardest, costliest kind of motor wear.

A valuable booklet on motor lubrication will be sent free on application. Lists every automobile made, and shows grade of MOBIL-OIL necessary for its perfect lubrication. Contains track records up to date, and facts of vital interest to motorists.

MOBIL-OIL, in barrels and in cans with patent pouring spout, is sold by dealers everywhere. Manufactured by

VACUUM OIL CO., Rochester, N. Y.



GILL FORGED Crankshafts



The P. H. Gill & Sons Forge and Machine Works, Lorraine and Otsego Streets, Brooklyn, N. Y. We wish to call the trade's attention to our L. K. Nickel Steel Crankshafts and Gear Blanks, etc., Domestic and Foreign.

No Drop forgings

We have special adapted Crank Pin Machines and Grinders for making Crankshafts true-round within one-quarter-thousandth of an inch. We also make axles complete, finished or forged only; also all kinds of automobile and marine forgings.

Crankshafts up to 6 inches diameter. All anvil-forged, hammered out of Acid O. H. Steel or Nickel Steel or Chrome Nickel Steel.

The P. H. Gill & Sons Forge and Machine Works
Lorraine and Otsego Streets, Brooklyn, N. Y.

THE RONSON WRENCH

(Patent applied for)



AN ENTIRE INNOVATION IN THE WRENCH LINE

In a compass of a 6" length and a weight of 8 ounces are comprised 9 perfect wrenches, ranging in size from 13-16" to 3-16".

Each of the four members shown is made of flawless plate steel most carefully heat-tempered, so that the wrench fully copes with almost any need in which a wrench is of service, while en route.

Each is a perfect wrench in itself.

The center bolt and wingnut are dropforged, and when one of the ends is pulled out for use, the rest form a handle giving immense leverage, making a perfect tool.

The wingnut has a squared shank, making it physically and mechanically impossible for the members to turn.

The wrench is beautifully finished in incorrodible nickel, and has sharp clean-cut lines.

A man can carry it in his pocket without any inconvenience and with the knowledge that he has a perfect substitute for wrenches which would weigh about five pounds, would take up half a tool box, would cost many dollars, and would serve the purpose not as well.

The thinness of the members, coupled with their great tensile strength allow the RONSON wrench to be used in places where no other wrench could be of service.

When next at your dealer's, be sure to get one.

No tool-kit is complete without it.

Price, \$1.50—less than half of that of the wrenches it replaces.

For sale by dealers everywhere, or direct on receipt of remittance, from

CRYDER & COMPANY, PARK AVE., AND 63d ST., NEW YORK CITY
SOLE AGENTS



COMMERCIAL POWER WAGONS

1910 Announcement

We manufacture the highest grade motor wagons ever produced—1,000 pounds capacity only—we are specialists in this particular line. Our entire new factory is producing only this one Chassis. We furnish bodies to suit any business.

HART-KRAFT MOTOR CO.
YORK, PENNA.

No Guesswork With a Radium Battery



If you ever had trouble from too little juice or too much when you had to "get there" or "get back," you realize how much of your motoring comfort and pleasure depends on knowing positively and always whether your available charge is just what it ought to be.

The Radium Battery

The Radium is the battery with a gauge that shows absolutely how much "available charge" you have at any time—you can't run short of juice—you can't burn out by an overcharge.

It's the only battery that has this valuable money, time and trouble saving feature. And there's a better battery in the world in any other feature—a perfect battery every other way—compact, cleanly, perfectly insulated, all hard rubber removable covers, patent vents, anti-splashes, post and connections one casting.

And it yields a fat hot spark that is dependable all the time on high or low gear.

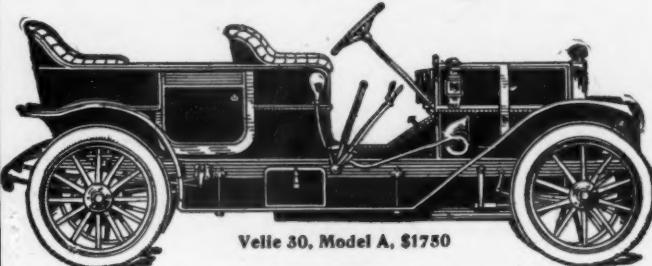
Write to-day for circular and price.

**General
Accumulator and
Battery Co.**

148 Second St., Milwaukee, Wis.



"Car Coming!"



Velie 30, Model A, \$1750

You must see the Velie 30 if you want to know how good a car can be sold for \$1750. Same motor, same transmission, same axles as are used in the best \$2750 cars. Velie design is snappy and graceful—Velie workmanship is highest grade—Velie tests are positive and convincing—Velie guarantee (for one year, not ninety days) is most liberal.

The Velie Line includes touring car, tourabout, roadster, with single or double rumble seat and toy tonneau, all with generous equipment.

Dealers and agents who are looking to the future as well as the present, will be interested in the Velie proposition.

Following are Leading Distributors:

John Deere Plow Co., Kansas City, Mo.
Deere & Weber Co., Minneapolis, Minn.
John Deere Plow Co., Omaha, Neb.
Velie Motor Vehicle Co., Moline, Ill.
Velie Motor Vehicle Co., Chicago, Ill.
Kilbourne-Corlew Motor Co., Boston, Mass.
Overbaugh-Martin Motor Co., New York, N. Y.
Keystone Automobile Co., Pittsburgh, Pa.
Standard Motor Car Co., San Francisco, Cal.
Standard Motor Car Co., Los Angeles, Cal.
Blue Grass Auto Co., Lexington, Ky.

Howard Demountable Rim

Change
Your Tires
in 30
Seconds

The End of
Tire
Troubles



By the turning of a single bolt you can change your tire in 30 seconds. No nuts, washers, wedges or rings to remove. Mechanical rim is double acting, so there is no chance for it to rust, corrode or stick. Send for catalogue. Any kind of a quick detachable tire rim can be used.

HOWARD DEMOUNTABLE RIM CO.
TRENTON, N. J.

THE LARGEST MAKERS OF LAMPS
AND GENERATORS IN THE WORLD



There is a Great Factory, an Immense
Organization Back of Every

SOLAR LAMP

Solar Lamps are made in the largest and best equipped manufacturing plant of its kind in the world, equipped with special machinery and every modern facility for building the highest grade Motor Lamps.

The BADGER BRASS MANUFACTURING CO.

Two Factories:

KENOSHA, - - WISCONSIN
437 Eleventh Avenue, NEW YORK

MORE Than An Electric

Woods Electrics have all of the desirable features—all of the "points" of any electric with many advantages that are **distinctive**. Will run 80 to 100 miles on a single charge—fifty miles unconditionally guaranteed. It was a Woods Electric that broke all electric hill climbing records and beat 12 gasoline cars in the bargain. (Kansas City, February 4, 1908—Algonquin Climb, August, 1907.)

They have the endurance of a touring car with an upkeep that sinks into comparative insignificance.

Woods
BUILT IN CHICAGO
Electrics
BEST BY TEST

set the Standard for **motor excellence**, grace and dignity of lines, luxurious comfort, long service.

"The Ideal Type of the Ideal Vehicle."

Exide Batteries used exclusively. Full equipment. Prices—\$2100 to \$2700.

1910 Agency Contracts with guaranteed delivery dates of delivery

Write for
Catalog "B"
Woods Motor
Vehicle Co.
Chicago, Ill.



PITTSFIELD 1910 HIGH TENSION MAGNETO

This is a Sample of the Testimonials
we are receiving:

GERARD & HALL, REAL ESTATE BROKERS,
HUNTINGTON, LONG ISLAND, N. Y.
PITTSFIELD SPARK COIL CO.,
Dalton, Mass.

Gentlemen: It might be interesting to you to know the success we had in the use of your magnetos on our Model "O" Knox cars. After investigating the various magnetos on the market we decided to use yours, and we have never regretted our choice. Our cars have been run some 14,000 miles, and we have had absolutely no trouble. The advantage of your instrument over others must be proven to any one who takes the time to investigate its merits. Briefly, we find that we can slow down the cars to 4 miles an hour on the high gear, and they run as true at that speed on the magneto as they do on the battery. Also the magneto will start the motor on the first turn of the crank with the spark fully retarded, avoiding any possibility of a "kick-back." To satisfy ourselves we recently examined the instrument for wear, and found them to be in perfect condition and adjustment.

We are recommending your magneto to all our customers.

Yours very truly,
(Signed) GERARD & HALL,
Agents for "Knox" Cars.

Write for particulars, catalogues, etc.

PITTSFIELD SPARK COIL CO.,

Dalton, Mass.

Sales Representatives: New England, W. J. Connell, 36 Columbus Ave., Boston; Atlantic States, Thos. J. Wetzel, 17 W. 42d St., New York; Central States, K. Franklin Peterson, H. V. Greenwood, 166 Lake St., Chicago; Michigan, L. D. Bolton, 319 Hammond Bldg., Detroit; Pacific Coast, The Laugenour Co., San Francisco.

PROTECTION

against
fire and explosion is maintained by the
installation of the

BOWSER

GASOLENE

STORAGE TANK AND PUMP EQUIPMENT

Every automobile owner should know
about this outfit.

ECONOMY AND CONVENIENCE

are among the many striking features and
advantages. Catalog J accurately illus-
trates and describes this equipment. A
post card will bring it.

S. F. Bowser & Co., Inc., Ft. Wayne, Ind., U.S.A.

BRANCH OFFICES:

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SAN FRANCISCO
208-210 Fisher Bldg.,
CHICAGO

1341 Arch St.,
PHILADELPHIA
66-68 Fraser Ave.,
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HOW TO SAVE FORTY-EIGHT NEW RUBBER TIRES



This way. Buy a set of Bricstons Detachable Treads. Each tread out-wears from three to six new tires. Cost is about half the average cost of new tires. One tire is thus equal in cost to two treads. Two treads outwear from six to twelve tires. A set—four treads—in cost and in wear equal from twenty-four to forty-eight new tires.

WORTH THINKING ABOUT—
ISN'T IT?

Bricston Tread Detachable

Is the real tire saver and expense
reducer. Certain relief from the
troubles comes to that motorist
whose tires are equipped with Bric-
son Treads. No other tire protector
affords near the protection—or cuts
tire bills down like the Bricston.
You'll do well to write today for
our latest booklet—The Enemy of
Tire Expense.

Use the coupon—and thus inform
yourself. Write

THE BRICSTON MANUFACTURING CO.
Box M. A., Brookings, S. D.

Cut the coupon along this line.

Bricston Manufacturing Co.,
Brookings, S. D.

Gentlemen: Please forward to me full information concerning the Bric-
son Detachable Tread. Send copy of your booklet, The Enemy of Tire
Expense.

Name _____

Address _____

Name of car _____

THE Spitzli

GUARANTEED

AUTO JACK

The SPITZLI Jack is the most powerful small Jack made

It is a dwarf in size, standing less than a foot high and weighing only six pounds, but it lifts a 4,000-pound car with the pressure of the foot.

That means Giant power in compact form.

The SPITZLI Jack is not only strong, but safe and sure.

Compound Safety Clutches fall into place automatically with each stroke of the handle and hold the load with perfect security at each elevation.

The patent extension ladder is instantly adjustable to any height motor axle.

The "reverse controller" reverses the action instantly from lifting to lowering, and the same up and down stroke of the foot accomplishes both.

The SPITZLI Jack occupies the smallest tool-box space of any Jack on the market, and when folded is only $10\frac{1}{2} \times 3\frac{3}{4} \times 2\frac{1}{2}$ " in size. It is always ready to give you a lift.

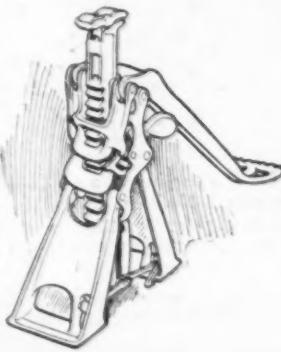
For quick action, strength, compactness, and wide scope of operation, it is in a class by itself.

Every SPITZLI Jack is fully tested before leaving the factory and is absolutely guaranteed to work every time—or your money back.

Send for free booklet "B" illustrating five different sizes of the Spitzli Jack.

Sold by reliable dealers or sent direct from the factory (address below) upon receipt of \$2.50 and 35 cents additional for express charges.

SPITZLI MFG. CO.,
UTICA, N. Y.



Reliance

SPARK PLUGS

MORE THAN ORDINARY



"Spark in Water"

Sure proof of their infallibility
and of their difference from the
ordinary. Attention is given to
every detail of their manufac-
ture. Perfection assured.

The porcelain used in their
manufacture is of a special heat-
proof composition. No break-
age. Assured ignition.

Simple and unique in construction, but
does all required, never missing, and no
cleaning necessary. Saves your battery and
coil. What more?

Made in Porcelain and Mica Backs. Send for Booklet

JEFFERY-DEWITT CO. DEPT. B. 222 HIGH ST. **NEWARK, N. J.**

S. & F. Stephenson, Agents for United Kingdom, 19 Canning Pl.,
Liverpool, Eng. Armand Frey & Co., Agents for Conti-
nental Europe, Berlin, Germany

WHY do the majority insist upon Diamond when getting a new chain?

Simply because thousands upon thousands of Diamond Chains are giving satisfactory service from one end of this country to the other, and the recommendations of their owners carry weight.

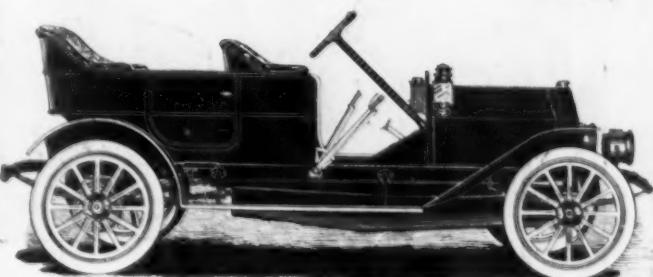
The man with a Diamond Chain Drive knows that it is flexible and strong enough to stand the hardest service on any kind of roads and in any weather. He knows that the maximum amount of power put into the transmission is doing useful work, and he knows that a chain drive offers little chance for being tied up on the road.

A Diamond Chain Drive will often come through serious accidents uninjured, while with a shaft drive the same jolt would have meant destruction or a long tie-up and repair bill. Diamond chains can be had from any dealer. **DON'T ACCEPT A SUBSTITUTE.**



The Diamond Chain Mfg. Co.
220 W. Georgia St. Indianapolis, Ind.
Capacity 8,000,000 feet per year.

The Johnson Car



We are putting upon the market a **first class car** at a reasonable figure. We are not giving something for nothing, neither are we **taking** something for nothing. That is, we give value received, and we will say more than value received if estimated by what others do for the same money. As we have earned a reputation in 25 years as the makers of fine mechanisms we cannot afford, even if we desired, to turn out a poor product. With an old establishment and more than \$1,000,000 invested we can serve you well. We make all **sizes** of cars but only one grade, that is, the **best**. From the minutest part to the final finish nothing can be better. What is more to the point, we charge you nothing for our reputation. We charge only for the car furnished. Save from \$500.00 to \$1000.00. Send for catalogue. By the way, what do you think of the style of our 1910 car as shown in above cut?

JOHNSON SERVICE CO., Milwaukee, Wis.

TOURING

Touring at this season is the most delightful of the year, but half the pleasure is lost if your car is not equipped with an accurate and reliable speedometer.

STAR Speedometer

is by far the best, most efficient, accurate and reliable, and least expensive of any speedometer made anywhere, at any price.



These claims are substantiated by thousands of "Stars" now in actual service, but we don't ask you to take our word for it alone — we eliminate every possible chance of dissatisfaction by letting you try the "Star" in your own way, under your own conditions, **FOR 30 DAYS** absolutely free, because we are so sure of its pleasing you more than any speedometer you ever saw or used before.

In the "Star" you have the best there is in speedometers, and the further pleasing knowledge that it has cost you less to acquire it than any other high-class speedometer. Accept our offer today; you have everything to gain and nothing to lose. At least get our booklet and know all about the "Star" whether you decide to try one or not.

STAR SPEEDOMETER CO., Danville, Pa.
New York City, 1755 Broadway Boston, Mass., 222 Eliot St.
Philadelphia, Pa., Geo. W. Neck Co., 126 N. Fourth St.



TROY 1910 SEXTETTE and SINGLE AUTOMATIC WIND SHIELDS

**NO. 10—(At top)
CHANGES 6
POSITIONS**

**NO. 11—(Center)
TWO POSITIONS
AUTOMATIC**

**NO. 12—(Below)
RAIN-VISION
CHANGES 6
POSITIONS**

**ROADSTER FRONT
NO THUMB SCREWS
NO RATTLE**

LOW PRICES

PROMPT SHIPMENT
Write Today for Big Catalog
THE TROY CARRIAGE SUN SHADE CO.
TROY, OHIO—U. S. A.

PROTECTION

against

fire and explosion is maintained by the installation of the

BOWSER

GASOLENE

STORAGE TANK AND PUMP EQUIPMENT

Every automobile owner should know about this outfit.

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WORTH THINKING ABOUT—
ISN'T IT?

Bricson Tread

Detachable

Is the real tire saver and expense reducer. Certain relief from tire troubles comes to that motorist whose tires are equipped with Bricson Treads. No other tire protector affords near the protection—or cuts tire bills down like the Bricson. You'll do well to write today for our latest booklet—The Enemy of Tire Expense.

Use the coupon—and thus inform yourself. Write

THE BRICSON MANUFACTURING CO.
Box M. A., Brookings, S. D.

Cut the coupon along this line.

Bricson Manufacturing Co.,
Brookings, S. D.

Gentlemen: Please forward to me full information concerning the Bricson Detachable Tread. Send copy of your booklet, The Enemy of Tire Expense.

Name

Address

Name of car.....

THE Spitzli

GUARANTEED

AUTO JACK

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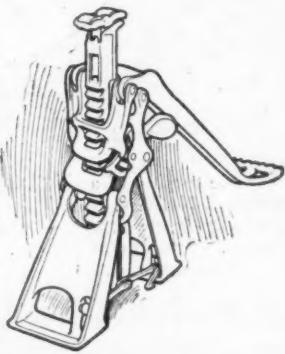
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Sold by reliable dealers or sent direct from the factory (address below) upon receipt of \$2.50 and 35 cents additional for express charges.

SPITZLI MFG. CO.,
UTICA, N. Y.



Reliance

REG. U. S. PAT. OFFICE

SPARK PLUGS

MORE THAN ORDINARY



"Spark in Water"

Sure proof of their infallibility and of their difference from the ordinary. Attention is given to every detail of their manufacture. Perfection assured.

The porcelain used in their manufacture is of a special heat-proof composition. No breakage. Assured ignition.

Simple and unique in construction, but does all required, never missing, and no cleaning necessary. Saves your battery and coil. What more?

Made in Porcelain and Mica Backs.] Send for Booklet

JEFFERY-DEWITT CO. DEPT. B., 222 HIGH ST. **NEWARK, N. J.**

S. & F. Stephenson, Agents for United Kingdom, 19 Canning Pl., Liverpool, Eng. Armand Frey & Co., Agents for Continental Europe, Berlin, Germany

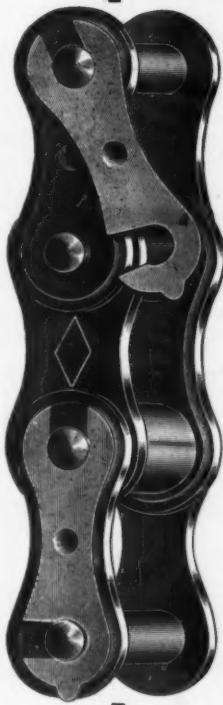
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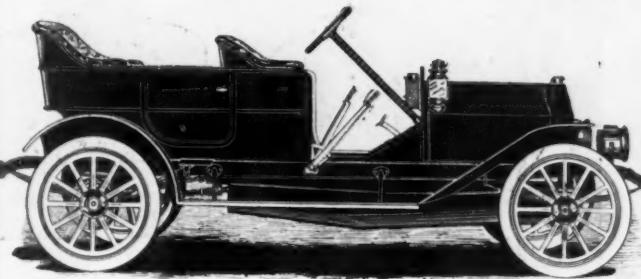
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Capacity 8,000,000 feet per year.



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TWO POSITIONS
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NO THUMB SCREWS
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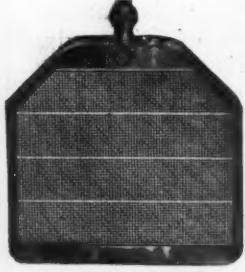
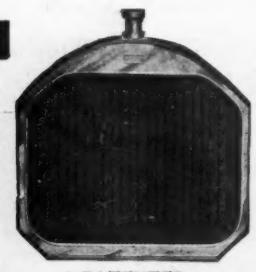
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We make Three Distinct Types of Radiators

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THE
L"
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LONG



DISTANCE COOLERS

THE AIR LIFT



A NEW PRINCIPLE IN CARBURETER CONSTRUCTION

By means of the Air Lift Principle, more power is developed with less gasoline than is possible by any other method in use today.

Hills heretofore impossible to climb are taken with perfect ease on the high gear.

Both higher and lower rates of speed are developed under absolutely perfect throttle control as a result of the automatic regulation of the mixture by the Air Lift.

Once adjusted no further attention is required; wide variations in temperature having no effect whatever on the perfect carburization which takes place at all times under widely varying conditions.

Booklet contains valuable notes on carburizing and explains why the Air Lift will entirely eliminate your carbureter troubles. Sent free on application, also details of plan for free 15 days' trial.

KALAMAZOO CARBURETER CO.
KALAMAZOO, MICH.



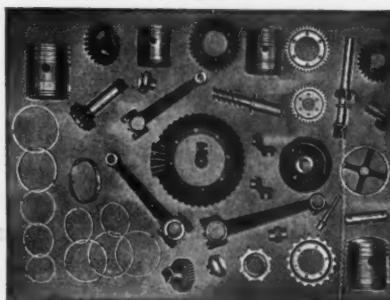
LONG'S RADIATORS

are the most efficient in point of radiation, workmanship and appearance. You can make no mistake in buying either of these types. For complete descriptive information

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LONG MFG. CO., CHICAGO

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WE MAKE AUTOMOBILE and MOTOR MACHINE PARTS like these shown in cut BETTER and CHEAPER than others, and give prompt deliveries because we have the facilities to turn out the work RIGHT. The latest and best machine tools only comprise our equipment.



GENERATED GEARS OF EVERY DESCRIPTION

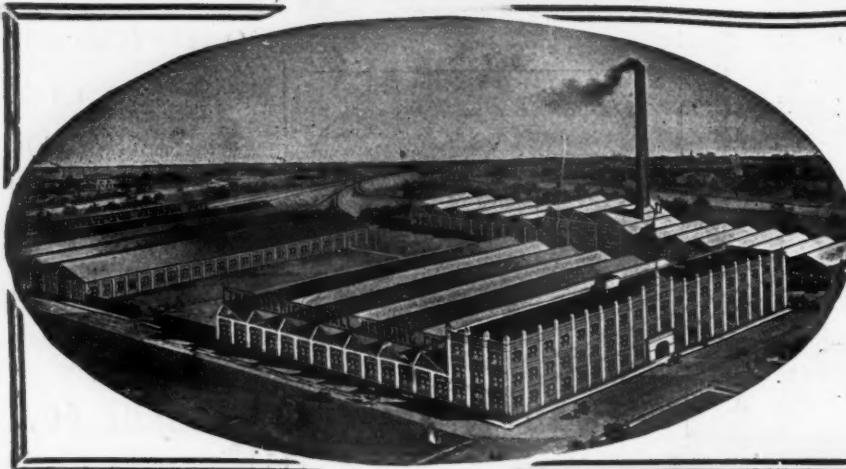


Finished Die-Cast Bearing Bushings
Made to Specification

Let us submit estimates based on your specifications and blue prints.

SPECIAL—Transmission Square Driving Shafts (all ground to dimension) made by special equipment of our own design.

THE F. W. SPACKE MACHINE CO., INDIANAPOLIS, INDIANA



The Output of Complete Front and Rear

Automobile Axles

of this plant exceeds the capacity of all competition combined

The American Ball Bearing Company L. S. & M. S. Ry. and Edgewater Park CLEVELAND, OHIO, U. S. A.

Monitor Solid Tire Motor Vehicles

CARS THAT RUN, STAND UP
Surreys, Runabouts and Delivery Cars

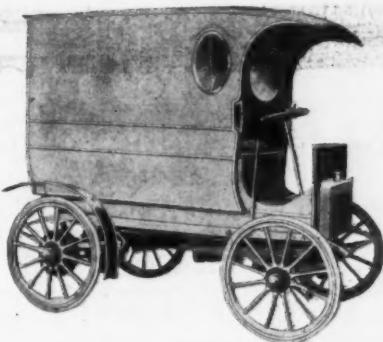


Model G Express Car

The Monitor wins the approval of all users, which demonstrates the high quality of workmanship and power embodied in Monitor Cars.

It is a Hill Climber

Write for 1910 Catalog



Model F Commercial Car

MONITOR AUTOMOBILE WORKS

General Offices, 517-520 Manhattan Building

CHICAGO

Telephone Harrison 1879



MODEL "K" \$2000

In our 1910 Model we have produced a car "chock full" of more value than any car we have ever seen. It has size to spare; power in plenty, always on tap; attractive lines, unsurpassed; endurance and wear, unequalled.

This year's improvements include a longer wheel base, a longer cylinder stroke, a larger radiator, a better breaking system and full floating rear axle.

It is such superior features that make the Pullman "Not only the Best at the Price, but the Best at Any Price"

PRICES AND MODELS:

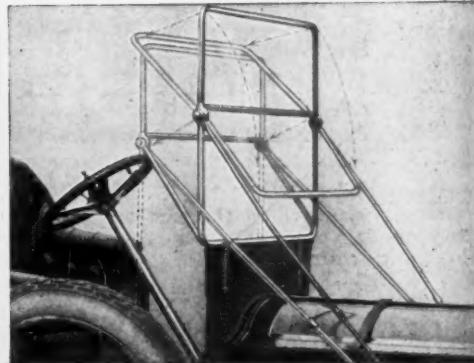
Model "K"—35 H. P. touring car or roadster.....	\$2,000
Model "4-40"—40 H. P. roadster.....	3,000
Model "M"—40 H. P. 7-passenger touring car.....	3,500
Model "O"—Light car (to be announced later)..... F. O. B. FACTORY, YORK, PA.	

Write for our ADVANCE ANNOUNCEMENT containing detailed information concerning the 1910 improvements in the Pullman Model "K."

York Motor Car Co., Inc., Department B, York, Pa.

Look up our Nearest Agent

ONE
FINGER
RAISES
OR
LOWERS
THIS
SHIELD



THE "FRICTION" WIND SHIELD

This is a wind shield that is mechanically perfect, has no springs, thumb nuts to rattle—cannot be broken by falling, because it can't fall. Made of seamless brass tubing, (view above) shows some of the many possible positions in which it may be adjusted. An interesting little book giving all details is sent on request. 41".....\$30.00 44".....\$32.50 Satisfaction guaranteed or money sent back.

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NEWARK, N.J.



Springs for Hard Wear

Cleveland-Canton Springs are not made for special occasions. When a spring leaves our factory, it is ready for any kind of rough and tumble work. We test it to worse conditions than it will ever meet in actual use. Springs made from C-C Special Analysis Steel, while very easy riding, are tough enough to withstand the severe strains and shocks to which they are subjected. Nothing but comfort and safety if your car is equipped with Cleveland-Canton Springs.

The Cleveland-Canton Spring Co., Canton, O.

A keen motorist searched wide and far
 For a TOP free from leaks, fade and mar,
 So he sat down and wrote **Pantasote**
 For some real **Pantasote**
 Now he's keen on the TOP.
 Not the car.

Send postal for samples and booklet.

THE PANTASOTE CO.,
 30 Bowling Green Bldg., New York City.

Try MILLER

This expression has developed into a trade term

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The public, which in the past has experienced difficulty in obtaining automobile supplies, should give us a trial, by mail, or a personal visit.

We Carry in Stock the Largest Assortment of
Parts, Fittings and Sundries

To be Found in this Country.

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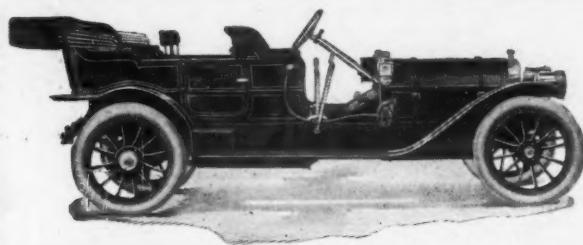
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The only six cylinder car in the world that sells for so little money,

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SILENT AS THE FOOT OF TIME

Specifications: Motor, 4½×5. TRANSMISSION, selective type. WHEELS, 36×4. WHEELBASE, 130 inches. IGNITION, magneto and dry cells. COLOR, dark blue, cream running gear; option, dark maroon cream running gear. TOOL BOXES, steel baked enamel. SEATING CAPACITY, seven passengers. STEERING WHEEL, natural finish. SPRINGS, platform type. BODY OPTIONS, seven-passenger touring car or close-coupled body. EQUIPMENT, oil lamps and horn, full tool equipment, including jack.

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THE SELDEN CAR

MADE BY THE FATHER OF THEM ALL

for 1910 is the embodiment of the best features in modern automobile construction. We know the design is correct. All of the constituent parts are made of carefully selected material and painstakingly put together. There is nothing to fall apart, drop off or "wabble." It is not a cheap car. It has staying qualities. It is always ahead.

TWO THOUSAND DOLLARS.

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Licensed under Selden Patent Members Association Licensed Automobile Manufacturers.

PATTERSON WIRELESS DRY BATTERY SYSTEM

If you were an Electrical Engineer you'd never let your new car come to you with Storage Batteries for Reserve Ignition. You'd certainly prefer a Battery Set that requires attention only once or twice in the whole season—and that's all the **PATTERSON WIRELESS BATTERY SYSTEM** requires.

Its fundamental principle is a SCREW TOP BATTERY CELL, which, without wires or binding posts.

screws into a Solid Rubber Composition Plate, automatically making all connections. This Molded Rubber Plate forms a solid, substantial, waterproof cover for the Battery Box, and as all Contacts are molded solid into this Rubber Plate, no possible loosening of connections, bad contacts, trouble from dampness, or anything of this sort is possible. The Battery Cells are SUSPENDED from the Plate and do not rest on any surface where dampness can collect. SEND FOR BULLETIN 63.

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Don't Tear Down Your Engine

An engine torn to pieces and scraped is seldom as good as before.

Prest-O-Carbon Remover chemically dissolves and removes every particle of carbon from cylinders, pistons, piston rings and valves.

For Auto, Marine and Stationary Engines

Cannot injure the metal. Cleans one cylinder perfectly in an hour for 25 cents or less. Increases compression, power, and durability. Does a better job than scraping. Simply apply with an oil gun.

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The Prest-O-Lite Co., 233 East South St., Indianapolis, Ind. Branches at New York, Boston, Philadelphia, San Francisco and Toronto

Makers of Prest-O-Lite Gas Tanks



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"The Twins" shown above are the latest addition to the Auto-Meter family. They make a particularly pleasing appearance on the dash. Both dials are illuminated by hooded electric bulb under the glass. There are no reflections and no outside rays to disturb the vision. The eight-day clock winds by a special device. No key is needed. You should see this new creation.

The Warner Auto-Meter

Guaranteed
Absolutely
Accurate

is made on the magnetic principle which alone is suited for speed indication. It indicates correctly every range of speed from zero to the extreme. Centrifugal instruments give no indication whatever under 5 to 10 miles per hour.

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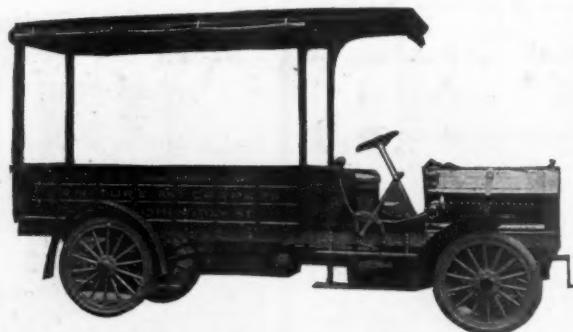
IF YOU HAVE A BEATSEMAL Repair Kit

you will find it makes the repair in less time and does it cheaper and better than is possible without its use. Does not injure the tube like vulcanizing. Carry only one extra tube, thus reducing the amount invested in tubes to the minimum. Tubes, you know, rapidly deteriorate, whether in use or not. In case of puncture put in the extra tube; while pumping up, let one of the party put a patch on the old tube and let the cement set while you travel.

No. 2 is 6 1/4" x 10 1/4" x 3"; contains high grade cement, patches, valve plungers, caps, etc.

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In point of design, appearance, finish, durability, accessibility to working parts and low cost of upkeep, they have no equal.

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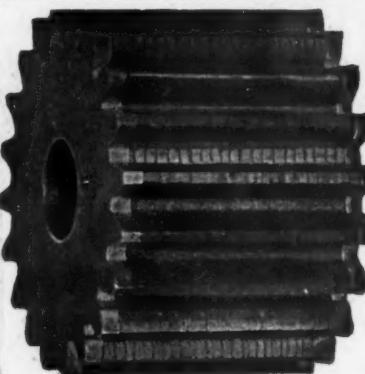
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A manual of useful information on the care, maintenance and repair of Gas and Oil Engines.

This work gives full and clear instructions on all points relating to the care, maintenance and repair of Stationary, Portable and Marine, Gas and Oil Engines, including How to Start, How to Stop, How to Adjust, How to Repair, How to Test.

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give the kind of satisfaction that makes you wish you had more of them. If lubricant was unnecessary you would never know they were on your car. We manufacture Universal Joints exclusively and can therefore furnish anything you want.

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Complete Drive, Type J-Joints

J-500, 30-H. P. J-600, 30-45-H. P.
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Speedy, Graceful, Easy-Running, Reliable

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EMERGENCY TIRE

A ONE MINUTE
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With a SLIP-OVER in your tool box you are always sure of getting in on time if you have a puncture or blowout. All you have to do is, slip a SLIP-OVER tire right over your casing, tighten up and be on your way. You can do it in a minute. Using a jack and getting dirty is out of the question. Mend your tire at home the next day.

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Trim, graceful, yet durable and comfortable. Commodious cuff, seamless palm with patent strap facing between two middle fingers, wrist strap at back emphasizing fit and trimness.

GREAT WESTERN KANTRY AUTO GLOVES

fit perfectly and have a distinctive character not quite equaled in any other glove. Brown and Black Colt's Skin, \$3.00. Imported Cape, Tan or Mocha, \$4.50. If not obtainable write us, stating size, color and dealer's name.

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Mfrs. Great Western Gloves
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The Bay State AUTOKIT

Will get at, fit and turn either way, any nut or cap screw on any car.

SPECIFICATIONS:

Universal drop forged steel handle; reversible slidable steel ratchet; two steel extension spring ball shanks; steel coupling; spark plug socket; thirty steel sockets; white nickel finish; black box mahogany finished inside; substantial nickel plated clasp.

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and get the following IMPORTANT FEATURES:

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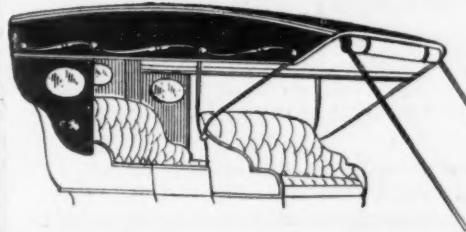
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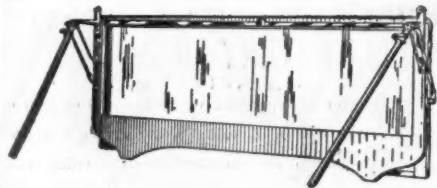
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Model D. 9—A prepossessing car, with every approved feature. 4 cylinder—40 H. P.—Timken roller bearing, % elliptic springs, selective type transmission, floating type rear axle, Atwater Kent Generator or Remy Magneto, single non-vibrating coil and dry cells.

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For 1909

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PRICES RIGHT

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Keeps your Radiator free from Scale Deposits and your Motor absolutely cool. We guarantee it is harmless, and can in no way injure any part of your car. Will send sample can for \$1; if not satisfactory, will refund your money. We also manufacture

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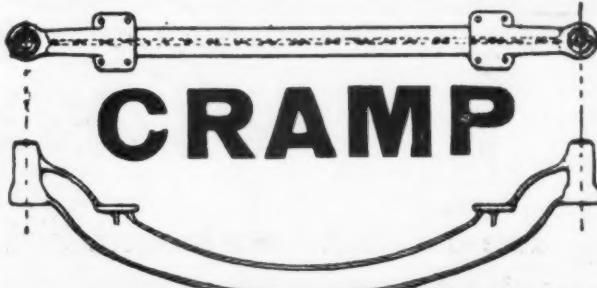
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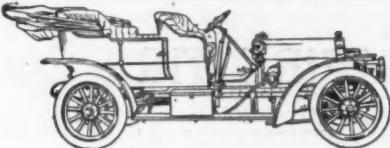
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are guaranteed to start the engine without batter es on the first quarter turn and run it perfectly at all speeds faster and better than any other system because it gives a hotter spark. It is the only Magneto that will run

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Adjustable from top alone.

More Power. More Speed

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Impossible to flood engine.

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Only perfectly dry gas.

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Full Record $\frac{1}{4}$ pint Gasoline per H. P. Hour.

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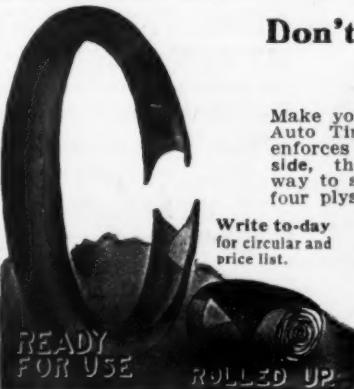
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CROSS MEMBERS

turn on swivel automatically, thus preventing wear on tires. Absolutely **SILENT**, gives positive traction and is most durable. Catalog on request.

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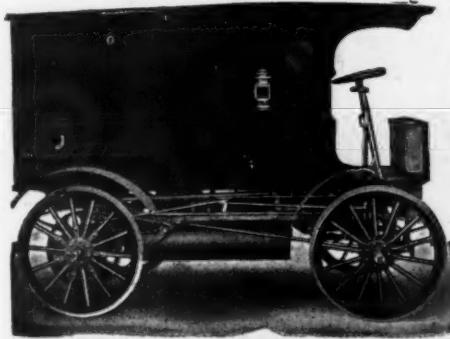
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Automatic governed motor; friction drive; interchangeable parts.

2-cylinder chassis, 18 H. P., 1200 lb. cap., \$1,100.

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Get a set of these jacks, and when you put up your car for the night or for the winter release the tires from the life destroying weight and the rubber destroying oils on the garage floor. It takes 15 seconds.

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Interesting Proposition for Dealers

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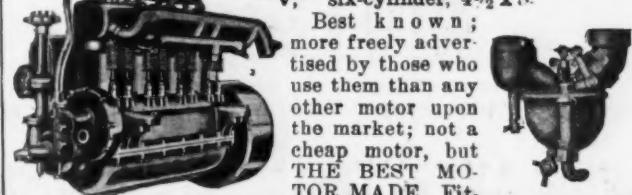
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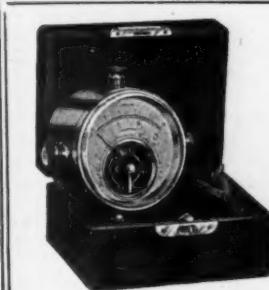
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Best known; more freely advertised by those who use them than any other motor upon the market; not a cheap motor, but THE BEST MOTOR MADE. Fit-

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There is nothing that contributes so much to higher motor efficiency as the discriminating use of Hoyt meters, in connection with the Ignition System. Bulletin M. A. describing our latest types is free for the asking.

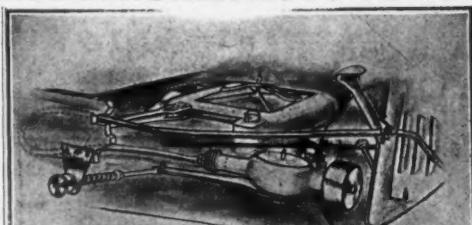
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ROHRBACHER AUTO POWER TIRE PUMP



Side view of A-1 Pump attached to Winton



Showing manner of attaching Auto Power Tire Pump to four cylinder Winton. Can be attached to any Winton model either four or six cylinders.

End view of A-1 Pump attached to Winton

Here is a Winton showing the Rohrbacher Auto Power Tire Pump attached and ready for business. Firmly bolted to frame of car it becomes a permanent fixture. By turning a pull-on-knob the friction wheel is brought in and out of contact with flywheel; and before you realize it the little wind-jammer has pumped 80 pounds of the purest air in your tire: the best tire preservative known. Why persist in using the "Bottle"? We will pay expressage on your first order. If your dealer or jobber does not handle them, write for catalog and price. ROHRBACHER A. A. PUMP CO., BLAINE, WASH.

**NOW FOR 1910—ARE YOU READY?**

WE ARE, and better prepared than ever—New Fabrics are in—New prices are in effect. A new deal all around. We are especially well fixed to talk Quantity to manufacturers and dealers. LET US HELP YOU TO DISTINGUISH BETWEEN QUALITY & PRICE. WRITE FOR CATALOG, SAMPLES, ETC.

VEHICLE TOP & SUPPLY CO., 9th and Cass Ave., St. Louis, Mo.

NORTH AMERICAN MOTORS

Selective Four Speed

Chrome Nickel

REAR AXLE TRANSMISSIONS

Direct on Third and Fourth

NORTH AMERICAN MOTOR CORPORATION, STAPLETON, NEW YORK CITY



ARMOR - PLATE YOUR TIRES

— and you can drive over the worst roads you can find anywhere, over bottles and bones, nails and stones, car tracks and rocky ruts.

The Kimball Steel Armor Makes Blowouts and Punctures impossible, and it doesn't affect tire resiliency. Cannot slip or skid.

You can use any old "thrown away" tire for years. It will make a new tire out of an old one, and will make a new tire outlast the best car made. A few sections on that weak place in your old tire will "show you." Send for detailed information.

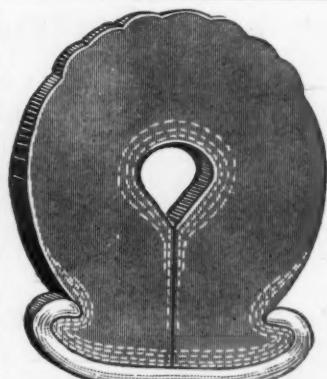
KIMBALL TIRE CASE COMPANY
173 BROADWAY, COUNCIL BLUFFS, IOWA

CAPACITY

FOR
Frames and Stampings

Hydraulic Pressed Steel Co.

Cleveland, Ohio, U.S.A.



"THE TIRE THAT NEVER TIRES"

The Cleveland Puncture Proof Air Cushioned Tire WITHOUT INFLATION

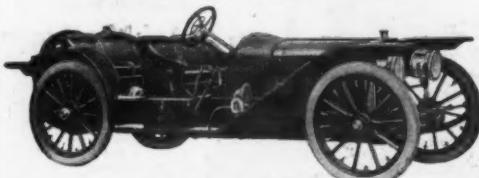
The Only Tire for a Long Journey

ASK FOR CATALOGUE No. 40

The Cleveland Puncture Proof Tire Co.

1355 N. High St. Columbus, O.

THE AMERICAN



"No Noise but the Wind"

THE TRAVELER

Underslung frame; 40-inch wheels; 4 cyl. motor, 50-60 H. P. Price \$4000.

The man who expects in his motor car the greatest possible efficiency and service and durability, the most comfort and satisfaction, does not hesitate at price. He wants the best and pays for it. And he finds the best in the American. Write for the literature.

Established dealers of high standing wanted
AMERICAN MOTOR CAR COMPANY, DEPT. H., INDIANAPOLIS, INDIANA
Standard Manufacturers A. M. C. M. A.



HANSEN'S

Auto Gauntlets

Send today for the latest literature on auto glove style and service

O. C. Hansen Mfg. Co.
335 E. Water St., MILWAUKEE

FOR
STANDARD CLINCHER AUTOMOBILE RIMS
DEMOUNTABLE RIMS

OR

STEPNEY SPARE WHEELS

WRITE TO
THE SPARE MOTOR WHEEL CO.
ST. ANNE - ILLINOIS

EAMES SOCKET WRENCHES



Automobile Set

A strong, convenient tool built for service. Fits all sizes Nuts and cap screws on any car.

Write for detailed information

Sales Agents Wanted In
all Cities

Eames Manufacturing Co. 44 Broad St. Boston, Mass.



Ye Joy Riders!

Have ye a Gobbo to protect ye from harm? Do ye belong to the "Gobboites", the Good Fellowship Auto Association? If not, join now. Be one of them by placing a Gobbo on your car.

Three Sizes.

3 in., Price 75c. 4 in., with base, \$1.50.
5 in., \$1.50

The MOTOR CAR EQUIPMENT CO.
55 Warren St., New York 1727 Broadway

OH! How It Hurts

to pay for a new set of chains every few weeks. Try

PERFECTION Non-Skid Climbers

HAVE ONE-HALF THE PARTS; GIVE THREE TIMES THE SERVICE

They are ideal, will not slip and cannot cut the tires for they are rough next the road and smooth next the tire.

They are built for service
TRY ONE PAIR AND BE CONVINCED

PERFECTION NON-SKID CLIMBER CO.

EDON, OHIO

Pacific Sales Corporation, 50-56 Van Ness Ave., San Francisco, Cal., Pacific Coast Representatives.



PRICE AUTO GLOVES

might be made cheaper but could not be made better. However, we are not trying to make them cheaper; we are determined to stick to our policy of using nothing but the best quality of selected washable Horsehide in the construction of Price Auto Gloves. The reputation of our goods will continue to be built up on good, honest merchandise.

On request, we will be glad to send our catalog showing the complete line.

FRIED-OSTERMANN CO., Successor
"The Glove Authorities". H. W. Price Co. DEPT. 24, ROCKFORD, ILL.



SHALER ELECTRIC VULCANIZER

No vulcanizer can be of practical value unless every point of the surface is heated to exactly the same temperature so that each part of the repair will receive the same amount of vulcanization. The heating unit on the Shaler Electric Vulcanizer entirely fills the interior, so that perfect vulcanization takes place. This is an EXCLUSIVE feature of the Shaler and helps to make it the ONLY practicable portable vulcanizer.



Write at once for free copy of tire hand book. It has a remedy for every tire emergency.

C. A. SHALER CO. BOX 5 Waupun, Wis.

WE NOW ENJOY A SECOND RISE IN TIRES.



Pat. Pending.

Don't you think Mr. Motorist that it will pay you NOW to investigate the

Brown Indicator

With proper inflation you get $\frac{1}{2}$ rd. more mileage—quite an item at the present time, say nothing of the convenience. Carried by all Supply Houses.

Price \$3.00

THE BROWN CO.

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COMBAT STORAGE BATTERY



6 Volt, 60 Amp. Hrs.

Hard Porous Plates
Non-Corrodinig Terminals
No Slopping of Acid
Neat, Compact, Handsome,
Durable

The Hall Storage Battery Co.
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Exclusive Selling Agents

FULTON-ZINKE CO.
1256 Michigan Blvd., Chicago, Ill.

"Little Giant" Air Compressors

are air compressors equal in every way to any compressors made and should have a place in every garage in the United States. It will pay for itself in a very short time through increased garage facilities.

Indispensable for inflating and testing automobile and bicycle tires, starting gas engines, operating brazing and heating machines, pneumatic tools, sand blasts, etc. Ask for details and prices. We also make Jacks and Vises of an exceptional quality. Write for booklet.

**Orange Mach.
& Mfg. Co.**
10-14 Stetson Street
Orange, N. J.





1910 Cartercar

The Model "H" is a 22 H. P. four cylinder runabout with a wheel base of 100 inches.

It comes equipped with magneto, gas lamps, generator, etc., for \$1,100.

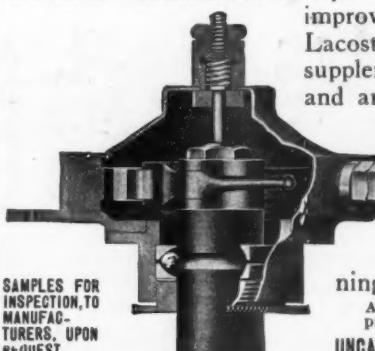
With Double Rumble Seat, \$1,125; with Double Divided Rear Seat, \$1,150; with Miniature Tonneau, \$1,150.

35 H. P. Model "L" 5 passenger Touring Car, \$1,600. Write Cartercar Company, Pontiac, Mich.

Leavitt Improved Wipe Contact Timer

To meet a demand for a Wipe Contact Timer we have improved upon the well known Lacoste Timer by adding a supplementary ground terminal and an adjustable ball-bearing in place of the plain bearing. This eliminates the two principal faults of this timer, i. e., poor ground and wobbling after running a short time.

SAMPLES FOR
INSPECTION, TO
MANUFAC-
TURERS, UPON
REQUEST



Are able to sell these timers at prices that defy competition
UNCAS SPECIALTY CO., NORWICH, CONN.



"Velos Make and Break Distributer"

The simplest and most economical igniter.

Used with one non-vibrator coil for any number of cylinders.

It will end your ignition troubles and save your batteries.

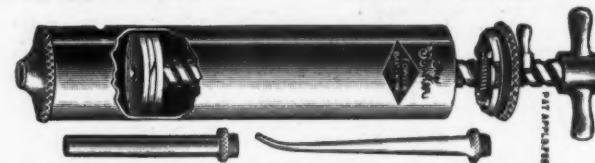
Write for catalogue.

Philadelphia Timer & Machine Co.

330 Vine Street

Philadelphia, Pa.

THE "FOWLER" COMBINATION GREASE AND OIL GUN THE HIT OF THE SEASON



The Fowler Gun represents "Two Guns" in one at the price of a single gun.

Price, \$3.00 a Piece

Manufactured by

The Fowler Brass Works,

2333-2335 WABASH AVE., PHONE CALUMET 2428, CHICAGO, ILL.



GOBO

The smiling god of good fortune. The original divinity of optimism. Whose cheerful countenance Brings good luck And happy days to all who Observe this rule of life:
"BE CHEERFUL AND YOU WILL BE RICH IN EVERYTHING."

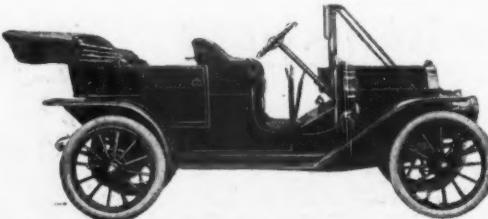
THIS IS THE MASCOT that has brought good luck to the Maxwell during the entire 10,000 mile non-stop engine run. Attach one to your radiator cap and you will have no hoodoo.

3 in size, 50 cents

5 in. size, - \$1.00

The S. M. Supplies Co.

22-24 Lincoln St., BOSTON, MASS.



30 H. P. \$1,500.00

Moline The Perfect Score Car

The lowest priced car that made a perfect road score in the 1909 Glidden Tour. The only car in the entire Tour that carried absolutely no extra parts. Write for Catalog 40, giving full information about the trustworthy Moline.

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If You Want Something Different Get The New Friction-Drive Lambert Proposition :: :: ::

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Complete Course Automobile INSTRUCTION

Invaluable to the owner or prospective owner of a motor car. Practical and to the point. Send for prospectus to the

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SUPPLEMENTARY SPIRAL SPRINGS

No. 7. Scroll End Spring.

are manufactured by the St. Louis Supplementary Spiral Spring Co. and all unlicensed makers of springs infringing our patents will be vigorously prosecuted. Suit having been started on one infringer already, it is time for the user to take notice, as he too is liable. **ACCEPT ONLY THE GENUINE.**

SUPPLEMENTARY SPIRAL SPRING CO.

Main Office and Factory, 4527 Delmar Ave., St. Louis, Mo.
New York Office, Room 202 Motor Mart Building,
62d Street and Broadway
Boston 893 Boylston St.; Chicago, 1426 Michigan Ave.;
Pacific Coast, 424 Stanyan St., San Francisco, Cal.;
Toronto, Can., T. Eaton Co., 190 Yonge St.

"ALL-IN-ONE" SPARK PLUG

The price of security
ease and satisfaction is an All-In-One Spark Plug. Let us send you one so that you may try it yourself. Remit **\$1.50**

and we will ship an "All-In-One" prepaid to you. Try it for thirty days. If you don't like it better, if you don't think it worth many times the value of any other spark plug in efficiency, ship it back and get your money. You can't begin to enjoy the advantages of the "All-In-One" too quickly. Send money and order today.

COMET ELECTRICAL MFG. COMPANY
DETROIT, MICHIGAN

\$1.50 EACH PREPAID

The "BROWNELL MOTOR"

STANDS FOR
BEST THROUGHOUT

in Type, design, proportions, material and workmanship. Nothing has been neglected.

Our three-point suspension Unit Power Plant, the ideal outfit for the automobile assembler, **HAS NO EQUAL**. Built in several sizes from $\frac{3}{4}$ inch bore by 4 inch stroke, up—in 4 and 6 cylinders. Heavy Motors and Transmissions for trucks, up to 5-ton capacity.

A Postal—A Catalogue

F. A. Brownell Motor Co., Rochester, N. Y.

Unit Power Plant, Automobile Model A-6
Automobile Assembler, **HAS NO EQUAL**. Built in several sizes from $\frac{3}{4}$ inch bore by 4 inch stroke, up—in 4 and 6 cylinders. Heavy Motors and Transmissions for trucks, up to 5-ton capacity.

BETTER CONTROL

FIT YOUR BUICK MODEL 10 WITH THE F-B CLUTCH RELEASER AND AVOID ACCIDENTS

The above cut shows the F-B Automatic Clutch Releaser in use; better control, no stooping for lever, a clear view at all times.

It enables you to control your car with the foot on engine brake. Pressure on brake disengages clutch. Has received the highest commendation from those using it. Shipped, charges paid, \$7.50. Write for Circular.

The F-B Company, Columbia, S. C.

THE CINC 1910

The "Road-stir" of the Season

November Issue—all about it and the reason

HABERER & CO. :: :: Cincinnati, Ohio

"WHITNEY"

PATENTED

We are making further improvements in our factory and equipment and are erecting a new plant for the hardening of chain parts which will be one of the finest Hardening Departments in the country. This will assist us in making prompt deliveries and further gains in efficiency and durability of all "Whitney" Chains.

WHITNEY MFG. CO. HARTFORD, CONN.

Grinnell "Rist-Fit" Auto Gloves With or Without Gold Initial are the ideal Automobile Gloves for winter.

The "Rist-Fit" is an exclusive feature. It is patented and found in no other Auto Glove. A "V" of soft leather is set into the cuff, giving a close, smooth fit at the wrist, with one pull of the strap or woven tape. The gauntlet never sags and all wind, snow and dirt is excluded.

For fall and winter the Grinnell "Rist-Fit" Auto Gloves have large roomy cuffs, readily admitting the largest coat sleeve. Warmly lined with elderdown, camel's hair knit glove, lamb skin, squirrel, etc.

GET A PAIR ON APPROVAL

Examine a pair of these gloves at our expense—just send us your dealer's name, with the size and style you prefer and a pair will be promptly sent you prepaid. For men and women.

MORRISON-RICKER MFG. CO., 64 Broad St., Grinnell, Ia.
Originators and Patentees of Ventilated and "Rist-Fit" Gloves.

BOSCH MAGNETOS

Acknowledged the World's Standard.

The only ignition with an unblemished record for highest efficiency. Over 320,000 in daily use.

RELIABLE POWERFUL ENDURING

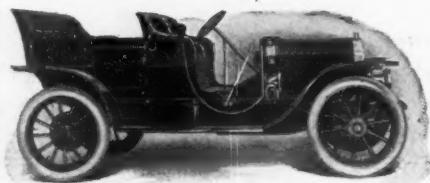
Write for booklet describing "Reasons Why the Universal Selection is always the Bosch."

BOSCH MAGNETO COMPANY
223-225 West 46th St., New York, N. Y.
Chicago Branch: 1253 Michigan Ave., Chicago, Ill.

In automobile construction, whether pleasure or commercial cars, by having the special shaped parts they are made as integral as a one-piece construction and eliminates the necessity of producing and maintaining extensive forging dies.

Ask for Catalogue No. C
containing valuable information

THE STANDARD WELDING CO., Cleveland



\$1600
THE
GREAT
WESTERN
30
Best Car at any
price

Greatest Power Plant, Lightest Weight

Complete equipment—including Magneto. Write for illustrated description of Model 30. Agents wanted for 1910

Great Western Automobile Co. Peru, Ind.



WE MAKE

G & J TIRES

of a quality that can always be depended upon. They give the kind of service that keeps a tire sold after it leaves the dealer's hands. Automobile owners using

G & J TIRES

have no occasion for complaints. They are always satisfied and good-natured.

G & J TIRE CO.
Indianapolis

1910-**STERLING**-1910

THE BIG VALUE CAR

30 H. P. 4 CYLINDER. \$1500.
Watch for Complete Specifications—You Will Be Interested
"STERLING CARS ARE STERLING VALUE"
ELKHART MOTOR CAR COMPANY
ELKHART, INDIANA

Don't Ruin Your Battery

if you own an electric vehicle—by discharging too far and by excessive overcharging. Avoid such troubles by using a

SANGAMO AMPERE-HOUR METER
which shows actual charge and discharge of batteries.
Bulletin No. 15—M.

SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

TRUFFAULT-HARTFORD SHOCK ABSORBER

The fact that Twenty Automobile Manufacturers use them—is the best proof that they should be on your car.

HARTFORD SUSPENSION COMPANY

144 Bay Street, Jersey City, N. J.

Branches in NEW YORK
212-214 West 88th St.

BOSTON
319 Columbus Ave.

WINTON SIX

Individual sales of 1910 Winton Six cars (each protected by deposit) have now reached a volume which permits of only one deduction—and that deduction is that our output will not be sufficient to meet the demand.

THE WINTON MOTOR CARRIAGE CO., 921 BEREAL ROAD, CLEVELAND, OHIO.

THE PERFECTED Chadwick GREAT SIX

The Fastest Stock Car in the World

Exclusive in design and construction. Six cylinders, 5-inch bore, 6-inch stroke, models for 1910 now ready. New catalog ready for distribution.

Chadwick Engineering Works, Pottstown, Pa.

"Standard Manufacturers A. M. C. M. A."



TRIMO EMERGENCY PIPE WRENCH

(A Wrench and Screw-driver Combined)

Made by TRIMONT MFG. CO., Roxbury, Mass.

The Name TRIMO will be found on every Trimo Tool

All Parts Interchangeable

Send for Catalog No. 80

The Gardner Engine Starter

Catalog
and
Prices.

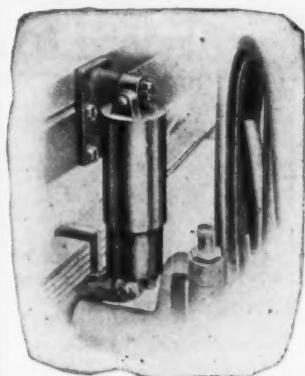


**THE SIMPLEST AND CHEAPEST
STARTING DEVICE EVER PLACED
ON THE MARKET**

10 to 20
very rapid
turns to
engine by
pressing
pedal.

New drive shaft and starter combined. Easier to place on car than a speedometer.
GARDNER ENGINE STARTER CO.
1451-1453-1455 MICHIGAN AVENUE
CHICAGO, U. S. A.

"Ride on Air"



Patented:
U. S. and all Foreign Countries

See That the KILGORE IMPROVED AUTOMOBILE AIR SHOCK ABSORBER

is included in the equipment of your 1910 car. If it is, you can feel assured that the life of your car will be prolonged, tire and repair bills cut down and that the occupants will ride over all roads with comfort and safety. The KILGORE is the only device that protects both DOWN and UP and yet allows the free, normal spring play. No attention whatsoever required.

30 days' trial. One year guarantee.

KILGORE MFG. CO.
585 Boylston St., Copley Sq.
BOSTON, MASS.

Charles R. Evans.
F. O. Kilgore.
Vice-Pres.
Tel. B. B. 1383

AUTOMOBILE WHEELS

Not the
Ordinary
Kind



AUTO-BUGGY WHEELS

Superior in
Quality and
Workmanship

25 Years' Experience in Wheel Making
Certainly is an Advantage and we have it

We would be pleased to figure with you on your requirements.

THE TURNBULL WAGON CO., DEFIANCE, OHIO

JERICHO HORN

The Road Clearer



Request
Booklet
54

The Randall-Faichney Co., Boston

GOOD YEAR

This Tire Sells Because it Saves

Saving of time and saving of money explain the popularity of the Goodyear Detachable Auto Tire on Good-year Universal Rim. Off or on in less than 60 seconds with no tools except a wrench. This is the

Goodyear Wrapped Tread Tire Made on Air Bags

Can't creep, can't rim cut. 90 per cent puncture proof. Let us tell you about the Goodyear Air Bottle service free to motorists for two years.

Goodyear Tire & Rubber Co. Wallace St.
Akron, Ohio

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About the

Speedwell "50"

Touring Cars, Toy Tonneaus, Roadsters and Close Coupled Styles.

**\$2500, Fully
Equipped**

The Speedwell Motor Car Co., Dayton, Ohio

McCULLOUGH-DALZELL CRUCIBLES

are always uniform, always THE best it is possible to make.

Write Specialty Dept. E for Lists and Prices

McCullough-Dalzell Crucible Company, Pittsburgh, Pa.

**MORGAN & WRIGHT TIRES
ARE GOOD TIRES**

"Without any Doubt about it"

Washington, D. C., Sept. 30, 1909.

Morgan & Wright,
Detroit, Mich.

Gentlemen:

As a matter of information to you, we wish to state that the Studebaker—E.-M.-F. Pilot Confetti Car in the Munsey Reliability Run from Washington to Boston and return was equipped with Morgan & Wright tires. The entire run was made on the original tires and they were not new when they started, having done considerable mileage on a demonstrating car. When this is taken into consideration, it proves that Morgan & Wright tires are good, without any doubt about it.

Wishing you continued success, we are,

Yours very truly,
COMMERCIAL AUTO & SUPPLY CO.

Agents for
Studebaker Automobiles.

MORGAN & WRIGHT, DETROIT



NONKORODA
TRADE
MARK
AUTOMOBILE AND WATER
RADIATOR JACKET
COMPOUND

A Dollar Bill

Expended for a can of "Non-koroda" will keep your Radiator, Water Jacket and Pipe Connections free from rust, scale and corrosion for an entire season.

For this insignificant sum you obtain positive insurance against expensive repair bills.

Don't save pennies and waste dollars—get a can today and try it.

Sold at all auto supply stores and garages or direct from

THE NONKORODA CO.
25-27 NEW CHAMBERS ST.
NEW YORK.



MR. BERNHART SAYS

that the Jewel car which went through the 2600 mile Gliddentour had "Perfect Ignition." He uses Sta-Rite spark plugs. Get a set right away. They are "Guaranteed Perpetually"—because they stay right longer than any other plugs.

The R. E. HARDY CO., Inc., 1900
Factory: 201 37th St., Brooklyn, N. Y.
309 Fisher Bidg., Chicago, Ill.

CHICAGO AUTO AGENCY

For full information regarding the
STODDARD-DAYTON

Address
McDuffee Automobile Co.
CHICAGO, ILL. MILWAUKEE, WIS.
Michigan Ave. at 15th St. 137-148 Eighth St.

What
E. H.
Harriman
has to say of

**"The
Only
Way"**

"The 'Alton' is today the best railroad
possible in the state of Illinois; the service
it renders is far ahead of most of the
railroads in the state; it has been made 250
per cent better for two-thirds of its original
cost; it is a perfect physical property,
wisely managed and run in the way to
give the people the best possible service.
You may quote me in this respect."

The Record-Herald, Chicago.

Perfect Passenger Service between Chicago—
St. Louis—Kansas City—Peoria—Springfield.

W. L. ROSS,
Vice-President

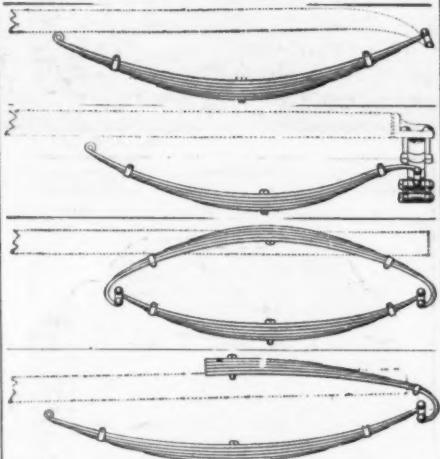
GEO. J. CHARLTON,
General Passenger Agent
Chicago, Ill.

RED RIB
The Best
for
The Least
That's
RED RIB
The Guaranteed Ignition Wire
Emil Grossman Company
232 West 58th Street
NEW YORK

THE UTOPIA
Storage Price
Battery \$7.50
6 Volt, 60 Amperes

STANDARD AUTO SUPPLY CO.
1428 Michigan Ave. Chicago

Spring's



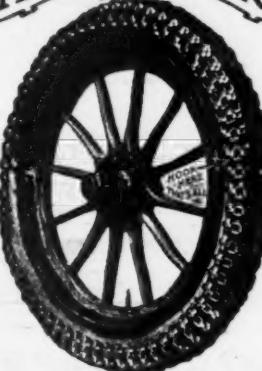
All designs for all Cars.
Alloy Steel or Crucible.
Consultation desired.

TUTHILL SPRING CO.
CHICAGO

Since **TIRE** Prices
ARE SOARING HIGHER THAN
AEROPLANES
BETTER INVESTIGATE

THE SLAMA PROTECTOR

No Punctures
No Skidding
All Steel
Detachable
Positive Traction
Adjustable Slipping
Front or Sideways Impossible



Gives A Tire Indefinite Life Never Can Heat, Stretch or Soak Up Mud Glass Cuts or Side wear from Ruts and Stones Entirely Defied

Protectors That Protect Without Penalties For continuous service, rain or shine. The best anti-skid known. Protects the tire from wear by wagon ruts, rocky or rough roads, and eliminating the danger of punctures and blow-outs. Gives the easy riding qualities of pneumatic with the care-free qualities of solid tires. Write today and profit by the information.

Slama Tire Protector Co. 617 E. 15th St., Kansas City, Mo.



Main Office, Detroit, Mich.
Pacific Coast Agency, George L.
& J. A. McPherson, Portland, Ore.

MOTORISTS

Fill in this blank and send to us. Our equipment means more than life insurance—Safety for yourself and those who motor with you.



THE FISK RUBBER COMPANY

No. 6 Main Street, Chicopee Falls, Mass.

I am driving car

Tire Size.....

I expect to buy car

Signed.....

Street.....

City and State.....

With the above data we can give you full details regarding changing your present equipment to Fisk Removable Rims and Bolted-On Tires or tell you how to get them on a 1910 Model. We will send our complete descriptive Booklet.

LET US GIVE YOU DETAILS REGARDING SAFE TIRES THAT YOU CAN CHANGE IN LESS THAN 3 MINUTES

New Adjustable

"S" PIPE

Get our prices on these new WRENCHES They will interest you.

This is a great wrench for inconvenient places. It is strong and durable, being drop forged steel throughout, and has patent nurl lock.



WRITE FOR NEW CIRCULAR.
THE BILLINGS & SPENCER CO., Hartford, Conn.



McCord Radiators—Lubricators

McCord Manufacturing Company
DETROIT

CHICAGO NEW YORK

Comfort without Extravagance

Hotel Woodstock
127 West 43rd St., New York.

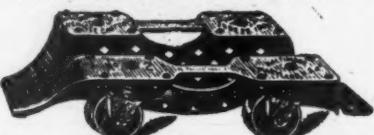
W. H. Valiquette, Manager.

*Rooms, with bath, \$2.50 to \$5.00.
Suites, \$5.00 to \$6.00.*

TIMES BUILDING **TIMES SQUARE** **HOTEL WOODSTOCK**

NORWOOD PORTABLE TURNTABLE OR CASTER

For Automobiles. Pat. June 25, 1907



Made in one piece. Cars can be run on or off from EITHER END; every desirable feature PATENTED; beware of imitations. One man can handle largest cars with ease. Indispensable for Garage, Factory Depot, etc. We hold VALID PATENT and will protect our customers. Don't be deceived, buy the best. For sale by largest jobbers and dealers in U. S. and abroad. Discount to the trade.

AUTO & ACCESSORIES MFG. COMPANY
1416 Madison Avenue, Baltimore, Md.

The IMPROVED

Valve Tap
and Die

Price
25c.



Drop forged
one piece tire
valve repairer.
Three in one—re-
moves insides, rethreads inside as
well as outside of valve. Handiest
tool ever devised.

THE MOTOR CAR EQUIPMENT CO.
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Yes, we make Pressed Steel or Angle Iron Running Gears

with any wheel base up
to 120 inches for Touring Cars or Roadster
Also all styles of bodies

BORBEIN AUTO CO.
2109 N. 9th St., St. Louis, Mo.

Our Specialty:
ROBBINS
Removable
Coupe Top
Designed and Built by
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PUMPELLY IGNITION STORAGE BATTERY
6 volts, capacity 60 ampere h's
Guaranteed to run car over two thousand miles with spark coil properly adjusted.

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and others see DYKE'S AUTO INSTRUCTION. It will save its cost the first week. JU-T IMAGINE having in your hands an engine cut in half, a magneto and a carburetor and my 24 Pages full of instruction on each and every part of the Auto and Engine. If I can't instruct you and make an expert of you I don't want a cent—if I do it costs \$10. Our working Models actually work.

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WITH THE EBERMAN AUTO-POWER TIRE PUMP

Your engine does the work, inflates your tires to proper pressure, lengthens the tire's life and saves you that hard work. Model A, \$15.00 (for small tires). (For large tires) Model B, \$20.00.

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He will tell you about it. Also THE REYNOLDS SKID you should have with you always.—The JERICHO HORN and all automobile and motor boat accessories.

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C. K. Ammeter, register up to 30 Ampere,	\$2.00
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The Ball Transmission
FOR
Automobiles & Motor Boats

NEW YORK GEAR WORKS.
56 GREENPOINT AVE., BROOKLYN, N.Y.

See Classified Advertisements on Pages 132-136

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The Only One for You

This auto scarf is indispensable to the motorist who wants actual comfort. Having the "V"-neck feature of the Bradley Full-Fashioned Muffler, it is knit in one piece, full-fashioned, without narrowing or puckering. It fits perfectly, will not crawl up or wrinkle, and thoroughly protects chest, back of neck and spine.

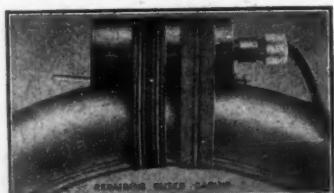
Made long and wide, from pure Australian worsted, with fringed ends and beautiful ocean pearl clasp. Range of fifteen attractive colors. All sizes, for men and women. Each auto scarf in an individual box.

Sold by the best dealers everywhere

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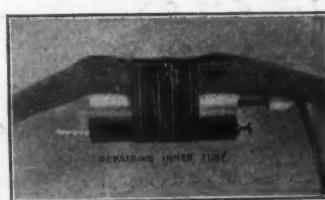




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Because it is the simplest, is automatically controlled and will not injure the tire. Saves time—Saves money—Saves patience. Write today for our booklet—"Tire Troubles." It's Free.

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**Drive Chains
—AND—
Sprockets
of all kinds for
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THE BEST IN MOTOR-CARS

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Did you send for
TRADE "THE SHOFERALL" MARK
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An indispensable outergarment for autoists.
Just what you need. Sent anywhere, prepaid
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Send for illustrated folder.



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It's all in the grooved discs
Write for information
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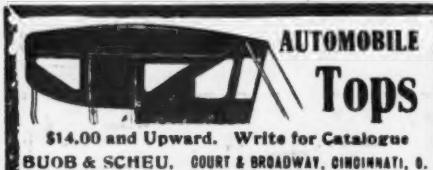
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excel all others in resiliency and durability. Then why not MOTZ TIRES? Fit clincher rims. Our free tool applies the tire. Send for Circular N.
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American Battery Company
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Established 1889.

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We guarantee our Welds in all metals. Send us your work
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\$1400.00
The car that established a New Standard in Automobile Values.
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50 cents for a sample carton which is enough for a bologna tire. Beware of imitations.

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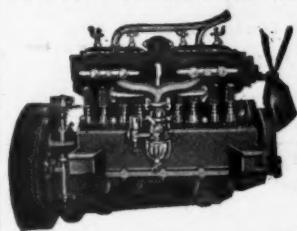


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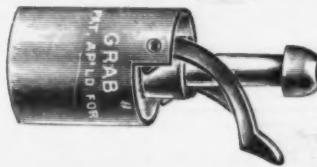
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Best of All Pump Connections The "GRAB"



Fits any valve. Simply clamps on and off. Leakage impossible. Nothing to wear out, nothing to get out of order. Makes connection instantly. Price Each, 25 Cents.

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LARGEST PLANT IN U. S.
UNEQUALLED FACILITIES

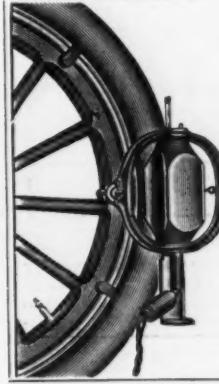
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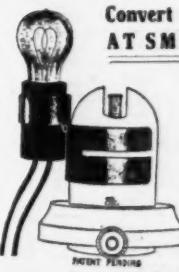
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Convert Your Oil Lamps to Electric AT SMALL COST AND LABOR



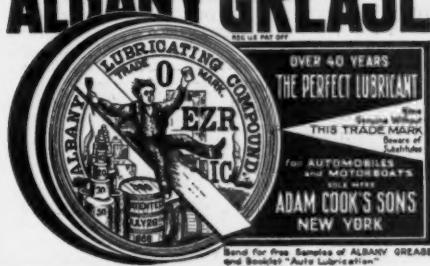
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Fit any Oil Burner

THE ATTACHMENT
consists of a double spring
brass clip, which grasps
the burner firmly and is equipped
with a wired socket ready
to be spliced to battery
wires or switch.

THE ADVANTAGE
This is the only attachment
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wick and burner, which usually
cannot be found when needed.
With this attachment the
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THE BECKLEY RALSTON CO.
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OVER 40 YEARS
THE PERFECT LUBRICANT

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The Most Complete Medium Priced Line
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Manufacturers not Assemblers
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A CHADWICK GREAT SIX AUTOMOBILE, 7-passenger touring car, for sale. This car has been refinished and overhauled mechanically and is guaranteed as to its condition. Chadwick Engineering Works, Pottstown, Pa.

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We have bought the entire plant and assets of the Grout Bros. Automobile Co. and will sell at an attractive price several of their new double chain driven cars. The Grout Automobile Co., Orange, Mass.

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All makes of automobiles from \$150 up. Fifty different cars; write for descriptive list.

AUTOMOBILES FOR SALE. A 5-passenger Cadillac touring car, in good running order, a good bargain and a good looker, \$275. A 2 or 4-passenger Reo runabout, with top and full equipment, nearly new, \$325. A new 1909 Mitchell runabout, with rumble seat and complete equipment, list price \$1,100, will close out for \$900. Van Ness Garage, Burlington, Vt.

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Price will be made specially low rather than hold over until spring. Write promptly for description and price. One of the best—if not the very best—on the market. Guaranteed every way. Write, O. B. Joy, care of Motor Age.

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FOR SALE—ONE BUICK MODEL 10 OF 1909 with surrey seat, complete with extra tire, speedometer, chime horn, electric lights, storage battery, tools, etc.; everything in first-class order. Emil Meurling, Cable, Ill.

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FOR SALE—RAMBLER RUNABOUT \$115. Success auto buggy \$95. C. E. Shook, Waterloo, Ia.

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FOR SALE—TWO TWENTY-PASSENGER, 30 h. p. sight-seeing cars; solid tires; good condition. High grade cars at a sacrifice; quick sale. Good reason for selling. Alamanac Motor Car Co., Haw River, N. C.

FOR SALE—TWO 2,500-POUND KNOX wagons. Motor Transp. Co., 1612 Carroll Ave., Chicago.

FOR SALE—3-CYLINDER '08 ELMORE touring car, with top, excellent condition. \$1,000. Address Box A1556, care M. A. v

FOR SALE—1 4-CYL. HAYNES TOUR- ing car, fully equipped..... \$975
1 2-cyl. Jackson, 1907 touring car, fully equipped 675
1 2-cyl. Jackson touring car, '06 model. 475
1 2-cyl. Rambler touring car, '07 detachable tonneau 600
1 2-cyl. Rambler touring car, type One. 425
All overhauled and guaranteed to be in A-1 condition.
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FOR SALE—1908 MARMON AIR COOLED, 45 h. p., with two bodies complete. Top, glass front, electric lights, chains, seat covers, speedometer, extra tires, gas tank, limousine body, newly painted. A bargain. American Automobile Co., Milwaukee, Wis.

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FOR SALE—1906 WHITE ROADSTER, new 1908 body, perfect condition, \$850 cash. H. C. Watts, 206 North Franklin Ave., Austin. Phone 1506 Austin.

HOLSMAN RUNABOUT, HARD RUBBER tires, just the thing for country roads. great hill-climber. Fred E. Hilton, Jeweler, Augusta, Me.

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MUST SELL '09 6-CYL. TOURING CAR; used only as demonstrator. Worth \$1,500; want \$1,200. Make offer. '07 Moline 5-pass., like new, \$550; '07 Moline roadster, fully equipped, \$700; '07 Columbia, like new, fully equipped, \$1,100. Meyer & Cloys Automobile Co., 550 Wabash Ave., Chicago.

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PEERLESS TOURING CAR, NEWLY painted and overhauled. New tires, full equipment. Cost \$3,500; will accept best offer. Send for photograph. Curtiss Mfg. Co., Hammondsport, N. Y.

PACKARD—AN OPPORTUNITY TO GET
a handsome, fully equipped, fine running touring car at really a bargain price. This car is such that anyone would be glad to own it and to drive it. Although it has been driven hundreds of miles, it has had excellent care and will be delivered in perfect condition.

Guaranteed as represented and will be submitted on approval. If interested write at once for description and price. This ad will not appear again. Price will warrant purchasing now instead of waiting until spring. Address "Immediate," care of Motor Age.

PRESKOTT STEAMER—SEATS 2 OR 4;
wheel-steer; three new tires, 18-inch dry plate boiler, Mason engine; all in good condition and will sell cheap; want an electric. Light & Ice Co., Flemingsburg, Ky.

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out a high class 18-passenger sight-seeing car immediately. This car is in finest shape and cost \$3,200. Highest offer takes it. For full particulars address Thomas J. Brennan (Agent), 633 Broad St., Augusta, Ga.

SIX-SIXTY, BRAND NEW, ALL THE BEST
—122-inch wheelbase, Mayo radiator, Weston Mott rear axle, full year guarantee, Splitdorf magneto. \$1,500. Car fully equipped. Address A-542, care Motor Age.

SNAPS—WE HAVE THE FOLLOWING
cars in perfect shape: One '05 Franklin touring car, one '07 Franklin touring car, one '06 Sterns touring car, one '09 40-h.p. Thomas flyabout. For further particulars apply, The Standard Auto Garage Co., Youngstown, Ohio.

STUDEBAKER 7-PASSENGER TOURING
car, completely equipped in perfect condition, every respect, like new; cost \$4,400; for quick disposal, \$1,800 cash. Address Box A558, care of Motor Age.

THE BEST SELECTION OF THE BEST
cars in the best condition at the best price possible. There are plenty of cars in any old condition for sale at almost any price, but our cars are all rebuilt and guaranteed by a responsible house and worth investigating. Nyberg Automobile Works, 2435-37 Michigan Ave., phone Calumet 1853, Chicago.

TIMES SQUARE AUTOMOBILE COMPANY,
1332-1334 Michigan Ave.,
Chicago, Ill.

Marvelous values in second hand cars. Quick action if you want any of these snaps. White Steamer, '08 model, 5-passenger, superb condition throughout. \$900.00 Winton, model "K," 4-cyl., 30-h.p., magnificent hill climber..... 650.00 Knox truck, very powerful, Swinehart solid tires, will carry two tons..... 200.00 Reo touring car, 2-cyl., 22-h.p., hill climber..... 375.00 Olds runabout, single cylinder, wheel steer..... 225.00 Autocar, 2-cyl., 5-passenger, light, powerful and fast..... 400.00 Rambler, 2-cyl., 22-h.p., surrey type..... 350.00 Cadillac, model "M," 5-passenger, just Ford 4-cyl., runabout, perfect condition throughout..... 375.00 Orient light delivery, 1,000 lbs. capacity, brand new..... 175.00 Stevens-Duryea runabout, top lamps and tools..... 200.00 Cadillac, model "B," top, lamps, horn and tools..... 275.00 Peerless roadster, rumble seat, excellent condition throughout..... 350.00 Cadillac, model "F," 5-passenger touring car, just repainted..... 325.00 Winton, 2-cyl., 20-h.p., 5-passenger, detachable tonneau..... 300.00 Autocar runabout, 2-cyl., late model, perfect shape..... 375.00 repainted..... 400.00 Buick runabout, model "G," 2-cyl., 22-h. p..... 460.00 Reo roadster, 2-cyl., 22-h.p., just thoroughly overhauled and repainted..... 350.00 Buick, 1908 model, 4-cyl., 50-h.p., 5-passenger, magneto ignition, fully equipped..... 950.00 250 other cars to choose from. Send for free copy of the Times Square Bulletin, our monthly magazine. This will assist you in making your choice of car.

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THE BEST OFFER TAKES MY ORIENT
4 h.p. friction drive buckboard, guaranteed like new. H. M. Whitcomb, Albany, Wis.

TO GET CASH QUICKLY, WILL SACRIFICE
1908 Model "E" Locomobile, 1908 Model 34 Rambler, 1907 Model 36 Thomas Flyer. Write for prices and complete specifications. Box 356, Reading, Pa.

WE ARE HEADQUARTERS FOR BOTH
new and second-hand cars. We buy and sell. Write us your requirements and we will do the rest. Mobile Auto Co., Mobile, Ala.

WE ARE NOT ADVERTISING BARGAINS.
There is generally something queer about a bargain. We are not brokers in second-hand automobiles and do not aim to make a big profit from the sale of used cars. We sell new Ramblers, and only take in old models to oblige our customers. Of course we must sell them and to do so quickly put them in such good condition, at such a fair price, that a demonstration will sell them. Get our list of used cars. Thomas B. Jeffery & Co., 1462-64 Michigan Ave., Chicago.

WE HAVE A FEW OF OUR 1908 AND
1909 cars, which have been exchanged for 1910 models. These include a Thomas Big Six, the finest of all cars; Thomas 4-cylinder 60-h.p. Flyer, and a Thomas Little Six, the most attractive car on the market. Must have the room and will make the price attractive.

Retail department,
E. R. Thomas Motor Co.,
1200 Niagara St.,
Buffalo, N. Y.

WE HAVE THE FOLLOWING CARS ON
hand which we will sell at a very low figure for immediate disposition: Buick four-cylinder, Cadillac four-cylinder, 1907 Pope, Jackson two-cylinder, and 1907 Thomas Flyer. Most of these are fully equipped and some have just been refinished.

E. R. Thomas Motor Co.,
1200 Niagara Street,
Buffalo, N. Y.
S. H. Department.

WESTERN AUTO SALES COMPANY,
309-10-11 Michigan Ave.,
Chicago.

Second-hand cars bought, sold and exchanged.
Hundreds of others too numerous to mention.
Write for illustrated catalogue.

Western Auto Sales Co., 1 block from 12th St. Station.

WHITE STEAMER.

Model E '05 car, recently re-cut, with new top paint, etc. Engine recently overhauled by the White Co. Equipped with five lamps and Rushmore generator. Two new cases and two extra tubes. Car looks like new and is as good as new. Any reasonable offer will be considered. Will demonstrate. Lock Box 176, Bryan, Ohio.

WHITE STEAMER, 1907, 7-PASSENGER,
nearly new; Baker electric, 1908, 3-passenger roadster, new; Studebaker electric, 1907, 2-passenger car; cruising launch, 60-h.p., new, complete; cruising launch, 40-h.p., fine boat; touring launch, 30-h.p., Standard engine. W. C. Stetson, 912 American Bank Bldg., Seattle, Wash.

WHY BUY A CHEAP CAR?

When You Can Buy

A rebuilt Stoddard-Dayton, fully equipped and guaranteed, for:

1907..... \$1,250
1908..... 2,000

McDuffee Auto Co., 1501 Michigan Ave., Chicago.

WINTON MODEL K, FIVE-PASSENGER
touring car in good condition, \$600; a bargain; will demonstrate any day. Herman Paul, Carlinville, Ill.

WRITE FOR OUR LIST OF SECOND-
hand cars. We will save you money. Prices from \$50 to \$2,000. All makes in stock. (All guaranteed.) Riley Bros., Bridgeton, N. J.

1909 BUICK 10 TOURABOUT, 4-CYL.,
4-passenger, in perfect order, run only short time, \$850. Maxwell demonstrator Model D, 4-cyl., in perfect condition with gas lamps, etc., \$900. Jackson Motor Car Co., Muscatine, Iowa.

2-CYLINDER ORIENT IN FIRST-CLASS
condition. Taylor Bros., 8 S. Hudson St., Oklahoma City, Okla.

4-CYL. 40-H.P. SHAFT DRIVE 7-PASSENGER
touring car for sale cheap. An ideal machine for livery use; cost \$2,850 new. Top, front, curtains, lamps, tools, horn, 36x4-inch tires; newly painted. First reasonable offer takes the car. Address A. G. Langher, 1140 26th St., Milwaukee, Wis.

\$600—if YOU WANT TO SPEND \$600 FOR
an auto, let me send you a photo of my car, which is a real bargain, and not a pile of junk.

\$300—A friend of mine has a \$300 car. Write me for full description if you want to save big money. We both have new cars. Mayor Hoppenyan, Ashland, Wis.

1909 LAMBERT 2-CYLINDER, 20-H.P.
Model A1, complete with top, gas lamps, storage battery; not run over 1,200 miles; excellent shape; \$625. Frogner Auto Co., Iola, Wis.

1 MODEL C JACKSON 1908 TOURING CAR,
in splendid shape; only run 1,000 miles; complete, top, Presto tank, etc., \$750. One Model C Jackson 1908, same equipment, has run about 3,000 miles; in fair shape, \$600. Griffith Hdw. Co., Rushville, Ill.

1909 MODEL C, 30-H.P. STUDEBAKER,
4-passenger car. Just as good as new. Delivered in August; run only 300 miles. Completely equipped. Cost \$3,500; will sell for \$2,650. Address W. B. S., 2920 South Park Ave., Chicago.

1 MODEL R STEVENS-DURYEA, 1 MODEL
A Franklin runabout, 1 Model F Knox runabout, 1 Model M Cadillac body, new. Connecticut Motor Car Co., Windsor Locks, Conn.

6-PASSENGER BLACK, BRAND NEW.
A splendid rig. I have no use for it. Send for photo and price. Mayor Hoppenyan, Ashland, Wis.

1909 60-H.P. 7-PASSENGER KNOX, FULLY
equipped, both limousine and touring bodies; engine never been used. Apply the L. Schreiber & Sons Co., Cincinnati, Ohio.

5-PASS. 45-H.P. RAMBLER, DOUBLE
chain drive \$750
5-pass. Apperson, 40-h.p., double chain drive 1,000
5-pass. Stoddard-Dayton 1,200
All these cars will be refinished, overhauled and guaranteed. Jos. F. Gunther Co., 1242 Michigan Ave., Chicago.

1909 REO CAR, PURCHASED JULY 24, '09.
In A-1 condition, with full equipment, extra inner tube, Husk chime and battery tester. Price \$975. W. C. Does, Lostant, Ill.

1909 THOMAS FLYER, 53-H.P., 7-PASSENGER;
cost \$4,800. Only cash offers considered. A. L. Sheridan, Lafayette, Ind.

For Sale or Exchange

FOR SALE—11-IN. BARNES LATHE,
2-h.p. stationary engine, 4-cylinder 20-h.p. auto engine. Wanted—Good motorcycle. Chas. E. Dale, Marseilles, Ill.

I WANT A 20 TO 30-H.P. 3-5-PASSENGER
car and cash for my 40-h.p. Model B (need wgt.). Mors; cost \$4,500, run 4 months; trade for clear farm or city income property. R. F. D. 29, Box 12, St. Louis, Mo.

ONE OR MORE FINE QUARTERS OF
land near Garden City, Kansas, to exchange for good auto. Box 687, Garden City, Kan.

WANTED—BUICK, OVERLAND OR HOLSMAN
for 80 acre school land contract, value \$800. Higinbotham, Red Lake Falls, Minn.

WANTED—GOOD 4-CYLINDER CAR OF
standard make in exchange for two residential lots in Anamosa, Iowa. Cement walk, well located and county seat town. Send full description first letter. Box 4, Center Junction, Iowa.

(Continued on page 184.)

(Continued from page 133.)

WANTED—TO EXCHANGE 160 ACRES OF land near Neillsville, Clark county, Wisconsin, 100 acres of oak and maple, 60 acres cut over land. In part payment will take 1909 4-cylinder, 30-h.p. shaft drive, 4 or 5-passenger touring car. Address, G. M. Wales, Lanark, Ill. P. O. Box 563.

WANTED TO EXCHANGE—A \$3,000 GASO- line car, in best of condition, for a White steamer. Freehand Steel Tank Co., Portage, Wis.

WANTED TO TRADE ADVANCE EN- gine and separator, clover huller, corn sheller and two water tanks with trucks, valued at \$800, for a Buick 10 or a T. Ford. R. D. Litwiller, Milford, Neb.

WILL TRADE 120 ACRES LAND IN GRE- nada county, Miss., for 1908 or 1909 car. Land only one mile from railroad station. H. C. H., Box 114, Greenville, Miss.

Cars Wanted

WANTED—SEVERAL SECOND HAND AU- tomobiles. Also one second hand automobile engine. Write describing machines in full and state lowest cash price. Address O. H. Longwell, President, Highland Park College of Engineering, Des Moines, Iowa.

WANTED—WHITE STEAM ROADSTER 1908 or 1909. State lowest cash price, condition and equipment. J. H. Anderson, 11209 Superior Ave., Cleveland, Ohio.

WANTED—'08 OR '09 CAR WHICH HAS Continental engine installed. 202 Marine Bank, Baltimore, Md.

WANTED—4-PASS. AUTO, 1908 AND LAT- er, in exchange for two Hinsdale lots (value \$500). Give full description of car. B. G. Merrill, Hinsdale, Ill.

WANTED—1-TON TRUCK; GOOD CONDI- tion; willing to pay from \$500 to \$1,000. Robert R. Ashwell, 341 Trumbull St., Hartford, Conn.

WANT TO CONTRACT WITH RELIABLE factory for medium weight four-cylinder five-passenger touring car on jobbing basis. Can use runabouts also. If open for business, address Box A 545, care Motor Age.

WE SELL AUTOS ON COMMISSION. We get results. We have had 18 years' experience. We are responsible. Our method of advertising is convincing. We can refer you to people who have tried us. If you have a car to sell a postal card will get you full information. F. Graham Auto Co., 1618-1624 Madison St., Chicago.

Parts and Accessories (FOR SALE)

ALL SIZES AND MAKES NEW AND RE- built tires for sale. Write for prices. Factory experts on repairing and retreading; work guaranteed. Charges paid on country work. Colonial Rubber Works, 2436-38 Michigan Ave., Chicago.

AN IMMENSE STOCK OF REBUILT tires with big mileage guaranteed, all sizes. all makes; save money through us. Tire repairing guaranteed. Best stock, reasonable prices. Ship us your work. Wisconsin Tire Repair Co., 186 Main St., Oshkosh, Wis.

ATTENTION, AUTOMOBILISTS — FUR lined coat, never worn; lined throughout with Australian mink, with magnificent Persian lamb collar. Will sell for \$35; cost \$200 in Canada. Pair cinnamon bear robes, \$30; cost \$175; and raccoon fur coat, \$30; value \$160. Call or write J. Loew, 520 W. 145th St., New York.

AUTO 1909 CASES AND TUBES, NEW, Fresh From the Factories.
Size. Case. Tube. Size. Case. Tube.
28x2 $\frac{1}{2}$... \$8.50 \$2.75 32x3 $\frac{1}{2}$... \$18.00 \$4.25
28x3 ... 11.55 3.10 32x4 ... 23.10 4.95
28x3 $\frac{1}{2}$... 16.40 3.85 34x3 $\frac{1}{2}$... 19.25 4.50
30x3 ... 12.00 3.30 34x4 ... 24.85 5.30
30x3 $\frac{1}{2}$... 17.05 3.95 34x4 $\frac{1}{2}$... 30.80 7.40
30x4 ... 21.80 4.40 34x5 ... 42.25 8.50
31x4 ... 23.85-31x4 fits 30x $\frac{1}{2}$ rims.

Also a few guaranteed cases, 30x3, \$14.10; 30x3 $\frac{1}{2}$, \$20.75; 32x3 $\frac{1}{2}$, \$22.05; single tube tires, 28x2 $\frac{1}{2}$, \$10; 28x3, \$12; seconds, \$2 less. I ship pay for tires after examination. Prices subject to change without notice. Wm. Vanderpool, Springfield, O.

BARGAIN PRICES.

For Sale—Shelby 1 $\frac{1}{2}$ and 1 $\frac{1}{4}$ tubing, less than manufacturers' prices; steel shafting, 1-in., \$2.20 per 100 lbs.; battery boxes, \$1.93; spring clips, \$1.87 and \$2.25 doz.; Bell cranks, \$8.40 hundred; step irons, \$1.25 and \$13.12 hundred; starting cranks, \$1.10 each; yoke ends, per hundred, No. 0 \$3.65, No. 2 \$4.20, No. 3 \$5.60; 12 7-passenger wood bodies, \$37.50 each. Write for prices on other bargains. Detailed description on application. Dolson Auto Supply Co., Muncie, Ind.

CAN SAVE YOU MONEY ON SAMPLES or headlights, tall lamps, robe rails, foot rests, tire holders, carbureters, coils, etc. Motor Requisites, Motor Mart, Boston, Mass.

DRAGON REPAIR PARTS.

We manufacture and keep on hand all repair parts for the Dragon cars. We make a specialty of repairing this machine. Phila. Machine Works, 67 Laurel St., Philadelphia, Pa.

FIVE PASSENGER TOURING BODIES; will fit any standard frame, \$30. Also other bargains. I. L. Breakstone, 1714 Michigan Ave., Chicago.

FORD OWNERS AND DEALERS—SEND for catalogue showing our outfit to convert any runabout into a handsome roadster; also rumble and surrey seats for "N. S. R. T." enclosed fenders, dash hoods, folding hoods, glass fronts, oilers, magnetos and every part for these cars. Ask for catalogue A. Write today. Auto Rebuilding Co., 130 Wabash Ave., Chicago, Ill.

FOR SALE.

A Kimball Demi-Limousine Top. Cost, new, \$335.

Bent glass windows, sliding glass wind shield, curtained complete. Had best of care and is in A No. 1 condition; fits 5-passenger car. First \$65 check takes it. M. H. Adams, 179 So. Water St., Chicago.

FOR SALE—AIR-COOLED OPPOSED motor, 5x5, \$55; 4x4, \$50; 4 $\frac{1}{2}$ x4, \$55; 4 $\frac{1}{2}$ x5, \$60; water-cooled opposed motors, 4 $\frac{1}{2}$ x4, \$50; 5x4, \$70; 5 $\frac{1}{2}$ x6, \$105; 5 $\frac{1}{2}$ x4 $\frac{1}{2}$, \$90; 4 $\frac{1}{2}$ x6, single cylinder, \$35; 3 $\frac{1}{2}$ x3 $\frac{1}{2}$, single cylinder, \$25; 5 $\frac{1}{2}$ x6, single cylinder, \$40; 4-cylinder opposed motor, 4x4, complete, \$90; 4-cylinder Rittenberg motor, 4 $\frac{1}{2}$ x5, \$175; 4-cylinder Milwaukee motor, 4 $\frac{1}{2}$ x5 $\frac{1}{2}$, \$250; 4-cylinder Danielson motor, 4 $\frac{1}{2}$ x4 $\frac{1}{2}$, \$190. The above motors second-hand. Marine or stationary engines, 1-h.p., \$20; 2-h.p., \$25; 3-h.p., \$30; 4-h.p., \$35; 6-h.p., \$45. One pressed-steel frame aluminum dash, 5x5, 4-cylinder Rittenberg motor, 2 axles, 4 wheels 36x4 $\frac{1}{2}$, 3 tires and tubes, 1 steering gear, 1 radiator, 1 set motors, 1 set levers, 1 set fenders, \$400. Get our list of parts. Auto Parts Co., 517-519 West Jackson Blvd., Chicago; old number, 52 West Jackson Blvd., Chicago.

FOR SALE—A LOT OF 34 AND 36 INCH wheels fitted with 4 $\frac{1}{2}$ and 5 rims. For full information address P. O. Box C, Cleveland, Ohio.

FOR SALE—A NUMBER OF NEW AND second hand five and seven passenger bodies, trimmed and painted. For full information address P. O. Box C, Cleveland, Ohio.

FOR SALE—COILS, CARBURETERS, timers, driving chains, mufflers, circulating pumps, tire pumps, tires, Warner differential for shaft drive car. Second-hand cars bought and sold. Square Deal Auto Works, 416 Cottage Grove Ave., Chicago, Ill.

FOR SALE—COMPLETE SET OF CAST- ings for vertical and opposed engines, air or water cooled, all sizes. Comet Motor Works, 17 West Madison St., Chicago.

FOR SALE—EXIDE SPARKING BATTERY. Never gave a spark since being overhauled by makers. Will sell for \$3.50. M. H. Adams, 179 So. Water St., Chicago.

FOR SALE—MARINE ENGINES, 4-CYCLE, 8-h.p., \$100. 16-h.p., \$200. 20-h.p., 4-cylinder, \$300. E. H. Clay & Co., Kinsman Road, Cleveland, Ohio.

FOR SALE—1 4-CYL. CONTINENTAL EN- gine, good shape; set 4 wheels, side chain drive and axles; tires almost new, 32x3 $\frac{1}{2}$, and new planetary trans. The first \$290 takes the bunch. United Auto Wks., 30th St. and Michigan Ave., Chicago, Ill.

FOR SALE—1 CYLINDER RAMBLER EN- gine, new complete with transmission, radiator, hood, etc., \$75 cash. A. R. Co., 1307 Wabash Ave., Chicago.

FOR SALE—\$5,000 WORTH OF ENGINES and auto parts, including machine shop, \$2,500. Will consider trade. Address Box 554, care Motor Age.

FOR SALE—4-CYL. 40-H.P. POPE-TOLEDO engine and transmission, \$150; one 30-h.p. Pope-Toledo, \$150; all repair parts for Pope-Toledos for sale. 513 Wabash Ave., Chicago.

FOR SALE—50 H. P. USED GAS ENGINE; is in excellent condition. Changing to electric power our reason for selling. Stewart & Clark Manufacturing Co., 502 Diversey Blvd., Chicago, U. S. A.

LIMOUSINE BODIES—A SNAP! BLAND Mueller Auto Co., Milwaukee, Wis.

LIMOUSINE BODY IN FINE SHAPE, FINE upholstering and wired for lights, size 35x86, \$475; also a fine town car body ("baby" Limousine), the height of elegance. S. Breakstone, 1712 Michigan Ave., Chicago.

MAXWELL OWNERS—WE MAKE UN- derpans of galvanized iron that thoroughly protect motor and transmission of Maxwell Model H and L cars of 1905 to 1908. Inquire of Maxwell agents or send us your name and address for circulars. Miller Brothers, White St., Tarrytown, N. Y.

MEN'S TAN GOVERNMENT KHAKI waterproof duster coat. From factory to wearer, 54 inches long; full military skirts; collar adjustable two heights; wind shields in sleeves; rain coat and duster combined; \$8.50 value for \$4.50. Express prepaid on receipt of price; money refunded if not satisfactory. Send for swatch. Fuller & Sullivan, 11 to 19 Elliot St., Boston, Mass.

MODEL 10 BUICK CLUTCH RELEASE; can be attached in 10 minutes; is worth \$100. With this you can control car with right foot. Price \$3 complete. Epps Garage, Athens, Ga.

ORDER QUEEN REPAIRS FROM C. H. Blomstrom Motor Co., Box 556, Detroit, Mich.

RADIATOR HOODS, MUD GUARDS, MET- al dashes, gasoline and water tanks. If building or remodeling a car it will pay you to write us, as we lead in this line. Auto Sheet Metal Works, 2230 Michigan Ave.

RUMBLE AND SURREY SEATS MADE for any car. Name car and send for catalogue G. A. R. Co., 1307 Wabash Ave., Chicago, Ill.

RUMBLE SEATS, \$10 EACH; SURREY seats, \$20 each. Fenders with mat and brass bound running boards, \$12 set. Cash with order. A. R. Co., 1309 Wabash Ave., Chicago.

SEVERAL SHOP WORN WIND SHIELDS in first-class condition; illustrations on request. Prices ranging from \$10 to \$20. A. G. Perretz, 1520 Johnson St., Chicago, Ill.

SPECIAL AUTO WASTE, 10 LBS. (SAM- ple order). \$1. prepaid. Wanted—500 old tires. E. Gross Company, Hartford, Conn.

TIRE SALE.
Extraordinary!
All brand new stock. Must sell.
Mail orders filled subject to prior sale.
Not the kind usually advertised.
Size Shoe Tube Size Shoe Tube
28x2 $\frac{1}{2}$... \$7.50 \$2.00 32x4 ... \$16.00 \$3.75
28x3 ... 9.50 2.25 34x4 ... 18.00 4.00
30x3 ... 10.00 2.50 34x4 $\frac{1}{2}$... 19.00 4.00
30x3 $\frac{1}{2}$... 13.00 3.00 34x5 ... 18.00 4.00
32x3 $\frac{1}{2}$... 15.00 ... 36x3 $\frac{1}{2}$... 12.00 3.00
34x3 $\frac{1}{2}$... 12.00 ... 36x4 ... 16.00 4.00
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A. H. Kasner, Oldest Tire Dealer in U. S., 152 Church St., New York City (near Chambers St.)

USE GRAY'S FILL-GUM OUTFIT
Permanently Repairs
Stone cuts, gauges and digouts.
Adds at least 1,000 miles to the life of your
tires.
\$1.00 Jobbers and Dealers—\$1.00
or
Standard Leather Washer Mfg. Co.,
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WE HAVE ON HAND A FULL LINE OF new and second-hand tubes at low prices. We sell and apply all makes of solid and pneumatic tires. Tire repairs our specialty. Chicago Tire Repair Co., Michigan Boul. at 35th St., Chicago. Phone Douglas 4592.

1905 PACKARD OWNERS—WE INSTALL
Hess-Bright bearings in Model N Packard rear axles, making them thoroughly up to date. Have special equipment for this work. Write for prices and references. Cornhill Garage, 360 Plymouth Ave., Rochester, N. Y.

45-H.P. RUTENBERG MOTOR, \$175; 40-H.P.
Milwaukee motor, complete, \$250; 4-cyl. T head motor, 30-h.p., complete, \$240; 5 1/4x6 opposed motor, \$115; 4 1/2x4 opposed motor, water or air cooled, \$75; 5x4 opposed motor, water or air cooled, \$80; 4 1/2x5 motor, water or air cooled, \$80; 4-cylinder air-cooled motor, complete, \$100; 1-cylinder Olds motor, \$40; 5 1/4x4 1/2 water-cooled motor, \$100; shaft-drive axles, \$70, per set \$85; sliding gear transmission \$50, selective type \$30; wheels all sizes; bodies, fenders and dashes. Get our prices. Auto Parts Co., 517-519 W. Jackson Blvd., Chicago; old number, 52 W. Jackson Blvd., Chicago.

Help Wanted

A FIRST CLASS, EXPERIENCED AND
well recommended automobile supply man to take charge of wholesale department; must be capable and willing to work. Give references and previous experience as well as salary expected. No. 609, Motor Car Publishing Co., Kansas City, Mo.

PARTNER WANTED—GARAGE, GOOD
agency, must be salesman and have \$2,000 to \$3,000; location Boston post road. Write M. C., care Motor Age.

WANTED—AN EXPERIENCED AUTOMOBILE
clerk to handle repair order system, acknowledge customers' orders, make orders to shop and follow same through the factory. State references and wages wanted. Address Box A-541, Motor Age.

WANTED—ASSISTANT SUPERINTENDENT;
none but experienced automobile men need apply; technically educated preferred. Good salary to the right man. Address Dayton Motor Car Co., Dayton, O.

WANTED—BY AUTOMOBILE MANUFACTURER,
five first-class draftsmen. State where at present employed, experience, age, salary and how soon you could report for work. Box A 549, care Motor Age.

WANTED—EXPERIENCED, A1 PIERCE
Arrow mechanic and repairman in large northwestern city to take charge and work in exclusive agency. Steady work and good pay to right man. Address H. S. M., care Motor Age.

WANTED—GOOD BUSINESS MAN FAMILIAR
with automobile business with \$6,000 to \$12,000 to invest in an established automobile business; a man who can sell cars may find an exceptional opportunity by addressing with full particulars, Box 437, Motor Age.

WANTED—HIGH CLASS REPRESENTATIVE
now calling on automobile manufacturing plants to handle on commission an absolutely necessary part of the equipment of each car. Address Box A555, care of Motor Age.

WE OFFER A HIGHLY PROFITABLE
specialty in connection with the automobile business to any serious minded, energetic young man desirous of getting along; exclusive territory; small capital required. Hydraulic Oil Storage Co., 603 Penobscot Bldg., Detroit, Mich.

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A HIGH GRADE AUTOMOBILE SUPERINTENDENT
or production manager, now engaged, is open for a new connection. Thoroughly experienced in drop forging, castings and the manufacture of all parts; 18 years of manufacturing experience. Supt., Box X, Motor Age.

CHAUFFEUR — COLORED CHAUFFEUR
wants position, private family, best of references. N. Fuller, 5700 Ludlow St., West Philadelphia, Pa.

CHAUFFEUR, EXPERIENCED MAN, 31,
own and operate public garage, wants position after November 1, New York city, or go south; expert on auto troubles and repairs. Highland Mills Garage, Highland Mills, N. Y.

SINGLE MAN, TWENTY-SEVEN YEARS
old, wishes connection with automobile concern handling accessories and supplies. In service of railroad as freight agent past eight years. Also have motor engine experience; go anywhere; best references. J. L. Grimes, Springville, Alabama.

WANTED—POSITION AS SALESMAN OR
sales manager. Am thorough business man, successful salesman and expert driver and mechanician. High grade references. Address Box A 547, Motor Age.

WANTED—POSITION BY MECHANICAL
engineer; experience in other lines, but desires to enter automobile field, either selling or engineering capacity, former preferred; references. Address K., care Motor Age.

Rebuilding and Repairing

ALL KINDS OF AUTO SHEET METAL
work done; we make a specialty of repairing radiators, lamps, fenders and hoods. Send in your work with directions. Guarantee satisfaction. Epinus, Haggstrom Mfg. Co., 1502 Michigan Ave., Chicago.

AUTOMOBILE REBUILDING AND MACHINE WORKS, 1720 Michigan Ave., Chicago. Special machine work done; parts made to order; expert auto overhauling; prompt service; work fully guaranteed.

RADIATORS REPAIRED BY EXPERTS.
Ship to us and follow with letter. A. R. Co., 1307 Wabash Ave., Chicago.

REPAINT YOUR CAR YOURSELF—with
our materials and full instructions you can repaint your car as well as a regular painter and save the big cost, labor. You will actually save from \$15 to \$50 by using the Arsenal system. Colors French gray, red, maroon, green and blue. We furnish everything needed for best work. Write today. Arsenal Varnish Co., Rock Island, Ill., Repaint Dept.

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Aluminum, cast iron, brass, copper, or any metal. Bring in your broken parts of automobiles or machinery and see it done. All kinds of automobile blacksmithing. C. Sorenson, 18 E. 16th St., near Wabash Ave., Chicago.

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A AUTO TIRE REPAIRED IN OUR SHOP
will give the very best of service. We also have a large stock of slightly used tires and tubes, all sizes, at very low prices. Buckeye Tire Repair Co., 331 Michigan Ave., Chicago, Ill.

A BARGAIN IN RETREADS.

Empire Retreads Do Not Loosen.

Skilled and experienced workmen using high grade materials and the most modern factory methods and equipment enables us to insure results.

Write Us About It.
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Empire Tire Co., 215 So. Seventh St.,
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AUTO CASINGS AND TUBES REPAIRED
and vulcanized—right and reasonable. Blowouts repaired, sectional repairs made. casings retreaded and recovered, motor cycle tires repaired. New tires sold. Get a square deal and your money's worth at The Model Vulcanizing Co., 1547 Michigan Ave., Chicago.

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saved by having your old tires retreaded thereby securing more than half the guaranteed mileage at less than half the original cost. Repairing our specialty. Agents for Batavia tires. Second-hand tires and tubes on hand. Ill. Tire Co., 3111 Michigan Ave., Chicago, Ill.

AUTO TIRES RETREADED, REBUILT,
etc., and tubes vulcanized by the
Montana Auto Tire Repair Co.,
409 First Ave. South,
Great Falls, Mont.
New and second-hand tires and sundries in
stock.
Write for prices.

OUR BUSINESS TO CURE TIRE TROUBLES. Let us know yours. Our guarantees amounts to something. Give us a trial, or send for reference. Harrison Quinby, Munice, Ind.

RETREADS AND RECOVERS THAT WILL
wear from 1,500 to 2,500 miles at one-third the price of new tires, must surely pay. Blow-outs guaranteed to hold as long as any part of the casing. Ask us about it. Fargo Auto Tire Repair Co., Fargo, N. D.

SEND US YOUR OLD TIRES. WE GUARANTEE
all repairs. Moderate prices. Oldest and most reliable repair shop in Ohio. The Tireshop, 5120 Euclid Ave., Cleveland, O.

SEND US YOUR WORN TIRES; BLOWOUTS,
rimcuts, retreads promptly done and guaranteed. We keep customers. North Side Vulcanizer, 283 N. State St., Chicago.

THE MADISON RUBBER TIRE WORKS,
Madison, Wis.

Auto tires recovered, rebuilt and retreaded. We have the very finest equipment obtainable and can absolutely guarantee perfect workmanship and prompt service. Write for our special price; immediate response to all inquiries.

TIRE EXPENSE REDUCED—PUNCTURES
repaired quickly, 25c each. Old tires made new, new selected tires, any make sold. Best work and materials, quickest service. Largest, oldest shop in the West. Let us sell you tires and do your repairs and we will cut your tire expense in half. Phone 1859 Calumet. Fanning Tire Company, Inc., 1510 Michigan Ave., Chicago.

TIRES RETREADED
and repaired one-fourth to one-half less than factory prices. Factory experienced workmen, using latest methods. All work guaranteed. Write for prices. Auto Tire Repair Co., Columbia City, Ind.

WILCOX BROS., TIRE REPAIRS.
Let us quote you prices on guaranteed repair work. We use absolutely the best repair stock on the market. Let us save you money on new tires. 1308 Michigan Ave., Chicago.

Ignition Repairing

COIL AND MAGNETO REPAIRING DONE
by factory experts. Satisfaction and prices guaranteed to suit. E. M. Snow, 1551 Michigan Ave., Chicago.

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(Continued on page 137)

(Continued from page 135.)

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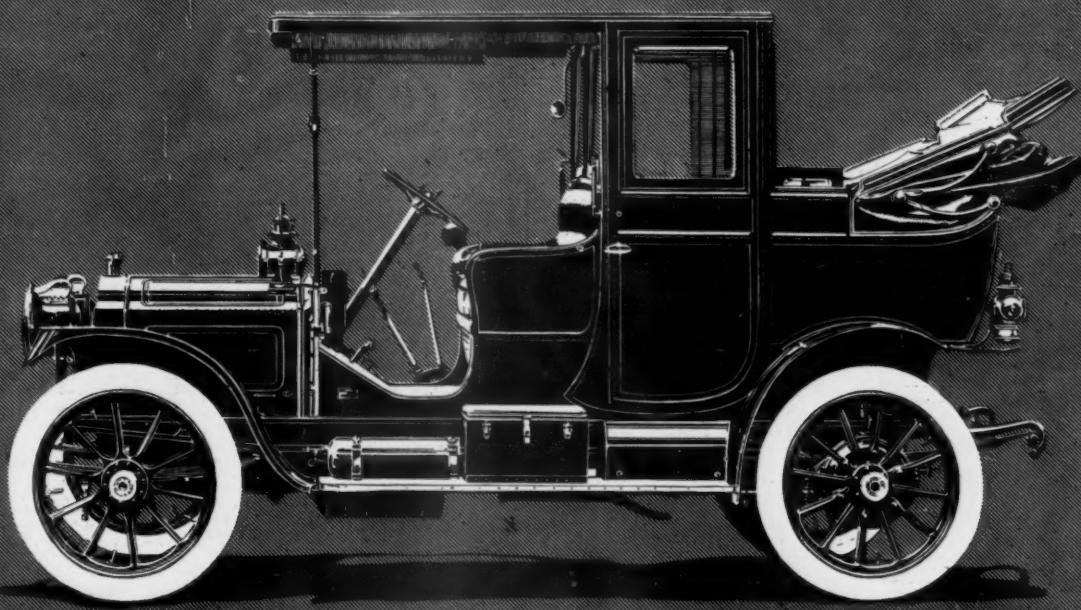
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Packard
MOTOR CARS

1910



Packard Motor Car Company
Detroit, Michigan

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Write for catalog of all 1910 Models

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